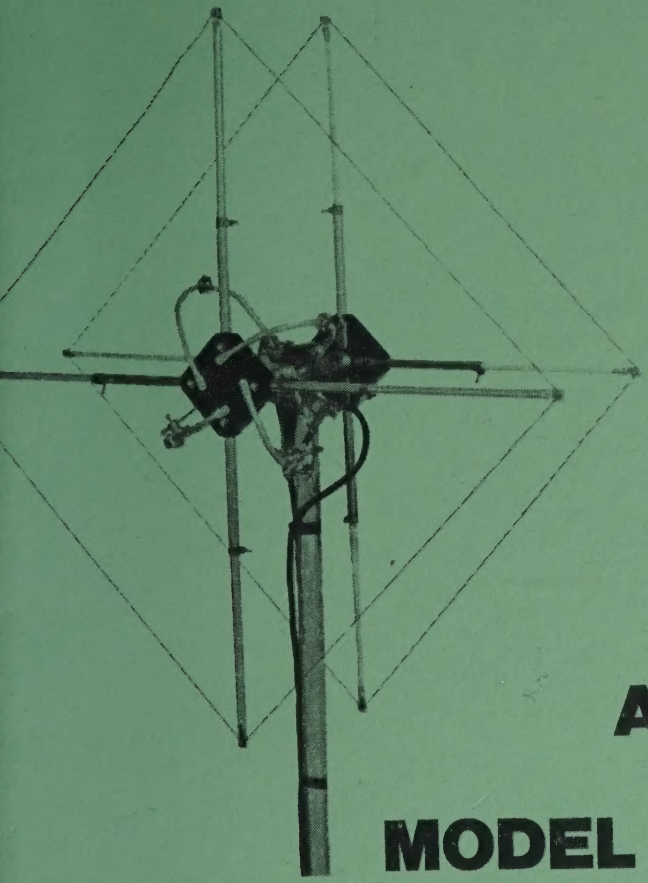
INSTRUCTION MANUAL



PDL-II ANTENNA

MODEL AV-120-2

avanti

PART NO. 1448

IMPORTANT INFORMATION PLEASE READ CAREFULLY

LIMITED WARRANTY

AVANTI R&D, INC. guarantees the materials and workmanship under normal use for one year from date of purchase. AVANTI R&D, INC. will repair or replace parts which are found defective in either materials or workmanship at no charge to the customer. In no event shall AVANTI R&D, INC. be liable for special or consequential damage. No claim under this warranty will be honored if the equipment covered has been misused, tampered with, or changed in any way. This warranty is in lieu of all others, expressed or implied.

AVANTI R&D, INC. LIMITED WARRANTY REGISTRATION

It is not necessary to return a warranty registration card. However, **SAVE YOUR SALES RECEIPT.** Should a warranty claim ever become necessary, simply send your sales receipt, or a copy of the receipt, along with the defective part to AVANTI R&D, INC. It is suggested that you simply staple or tape your sales receipt to your instruction booklet for future reference. Your sales receipt is your proof of purchase date.

HANDLING OF WARRANTY CLAIMS FOR FASTEST SERVICING

All warranty claims should be directed to AVANTI R&D, INC., 340 Stewart Avenue, Addison, Illinois 60101 in order to expedite prompt service. Any part that is felt to be defective in either materials or workmanship should be sent prepaid to AVANTI R&D, INC. for evaluation, repair or replacement. It is not necessary to return an entire unit, but only those part(s) that are defective. All returned units will be shipped prepaid.

Mention this no.
if you contact us
about your purchase.

PARTS LIST

AV-120
PDL-27-A

NOTE: CHECK ALL PARTS WITH THIS LIST BEFORE DOING ANYTHING. MAKE SURE YOU KNOW WHAT EACH PART IS AND WHAT IT LOOKS LIKE.

Part No.	QTY.	DESCRIPTION	PRICE
HARDWARE			
Sub 111	1	Kit – Complete	$8.80
1195	20	10-32 x ½" Panhead Screws	.11
1196	2	10-32 x ¾" Panhead Screws	.11
1197	4	10-32 x 1½" Panhead Screws	.11
1165	14	#10 Flatwashers (5/8" O.D.)	.06
1151	22	#10 External Starwashers	.06
1091	16	10-32 Hex Nuts	.06
1099	8	10-32 Square Nuts	.06
1188	2	¼-20 x 1" Bolts	.17
1187	14	¼-20 x 1¼" Bolts	.17
1189	3	¼-20 x 1½" Bolts	.17
1152	17	¼" Flatwashers	.06
1153	17	¼" External Starwashers	.06
1090	17	¼-20 Hex Nuts	.06
1098	2	¼-20 Square Nuts	.06
1306	4	5/16 x 3/8 Bushings	.27
1055	4	Junction Clamps	.55
1307	2	Gamma Fasteners	1.10
1308	2	Gamma Fastener Swivel Inserts	.72
1053	8	Adjustable 5/8" Pipe Clamps	.27
1004	1	Black Plastic Boom Plug	.27
1003	1	Red Plastic Boom Cap	.27
1005	8	Special Curved Retainer Plates	.55
1071	2	5/16 x 1¾" U-Bolts	.82
1156	4	5/16" External Starwashers	.06
1092	4	5/16" Hex Nuts	.06
PARTS			
AV-501	1	H-V Switch Box	12.05
1449	1	1-5/8" x 4'10" Boom Tube	3.85
1000	8	5/8" x 3' Elements, Inner	3.85
1001	4	½" x 4' Driven Elements, Outer	1.65
Sub 110	4	½" X 4' Fiberglass, Reflector Elements, Outer	3.85
1008	2	5" x 5" Plastic Hubs	3.85
1311	2	Coils Radiation Wire	3.85
1305	1	Mast Mount	3.85
1007	2	Metal Hub Halves	1.65
1050	4	Curved Section, One End Flattened	1.10
Sub 108	4	Curved Section, One End Expanded	1.10
Sub 105	1	Connector Bracket	3.85
Sub 106	1	Gamma Match – 24-¼" Coded Black	3.30
Sub 109	1	Gamma Match – 26-¾" Coded Brown	3.30

TOOLS NEEDED

1 Medium ¼" Screwdriver
1 Adjustable Wrench or ½" Open End
2 7/16 Open End & 3/8 Open End Wrench
1 Pliers
1 Yard Stick
50' Tape Measure
6" Ruler

ASSEMBLY INSTRUCTIONS FOR MODEL AV-120-2

STEP 1: DRIVEN ELEMENT SUB-ASSEMBLY

a) Turn to Figure 10.

b) Take four 5/8" O.D. tubes (spreaders). Put the ends with two holes into each of the corner slots of the black hub.

c) Insert ¼-20 x 1¼" bolts with ¼" flat washers through plastic hub in outer holes only. On the other side, place curved retainer plates over bolts. Put nuts and starwashers on bolts and tighten.

STEP 2: REFLECTOR SUB-ASSEMBLY

a) Turn to Figure 10.

b) Duplicate the DRIVEN ELEMENT SUB-ASSEMBLY procedure with the remaining hub and four 5/8 O.D. tubes. EXCEPT insert ¼-20 x 1¼" bolts through all eight holes in the hub.

c) BE SURE to use flat washers on plastic hub and lockwashers on metal retainer plates.

d) Tighten all bolts securely.

STEP 3: BOOM ATTACHMENT

a) Insert RED painted end of large diameter aluminum boom tube into REFLECTOR sub-assembly just completed. This is the assembly with all 8 bolts in hub.

b) Align the hole on side edge of black hub with hole in boom.

c) Insert 10-32 x ¾" screw into hole in edge of hub, pass the screw through the hub and through hole in boom.

d) Hold 10-32 nylon self-locking insert nut inside of boom tube with fingers and tighten with screwdriver. Boom will extend 1" beyond hub.

e) At this point, slip mast mount over the boom. IT IS IMPORTANT TO DO THIS NOW as later you could not get mast mount past the hubs.

f) Set assembly aside.

STEP 4: CONSTRUCTION OF THE CURVED MATCHING SECTION IN FIGURE 1

a) Place the ends with holes of the four expanded curved sections in the two metal hub halves.

b) Position the connector bracket on the hub as shown. Use ¼ x 1½" bolts to fasten both hub halves and the connector bracket together. Insert ¼ x 1¼" bolts in the two remaining holes. Use flatwashers under the heads of the bolts and a ¼" starwasher under each nut.

NOTE: TIGHTEN NUTS ONLY FINGER TIGHT.

c) Slide this assembly 26¾" onto boom. The curved sections should be pointing away from the mast mount (or toward the front). Measurement is taken from the edge of the boom to the face of the metal hub as shown in Figure 2. Position the connector bracket parallel with the horizontal spreaders of the reflector.

d) Place driven element sub-assembly (the one set aside in Step 1) onto the remaining end of boom, the side printed AVANTI R&D surface to the outside.

e) Align hole on side edge of hub with hole in boom.

f) Insert 10-32 x ¾" screw into hole in edge of hub, through hub, and through the hole in the boom.

g) Place 10-32 nylon self-locking insert nut on screw and tighten as in Step 3. Boom will be flush with hub.

STEP 5: INSTALLING THE CURVED MATCHING SECTIONS TO THE PLASTIC HUB

a) Turn to Figure 10. Figures 3, 7, and 9 will also be helpful.

b) Insert 4 blushings into the 4 remaining holes of the driven element hub.

c) Attach the four curved sections to the driven element hub as shown in Figure 10. Use all starwashers in their proper place as per drawing.

d) Leave hardware loosely fastened.

STEP 6:

See Figure 4. Prepare gamma fasteners as shown. Leave all hardware loose. Swivel insert should be flush with the edge of the gamma fastener after insertion.

STEP 7:

Prepare four junction clamps as shown in Figure 5. Bend both sides of the clamp so the sides are parallel with each other.

STEP 8:

Place gamma fasteners on both curved matching sections that point downward as shown in Figures 3 & 6. Leave loose.

STEP 9:

After sliding the gamma fasteners onto the curved sections, slide on a junction clamp - one clamp on each of the four joints as in Figures 3 & 6.

STEP 10:

Push the curved sections coming from the front plastic hub together with the curved sections which are attached to the rear metal hub as in Figures 3 & 6.

STEP 11:

Place the junction clamps over the enlarged part of the joints and tighten the screw until the joint is tight. See Figure 6.

STEP 12:

Tighten all other bolts and nuts on the metal hub.

STEP 13:

Tighten the 4 screws left loose in Step 5 (d).

STEP 14: TO SECURE THE METAL HUB TO THE BOOM. Figure 7.

a) Start a ¼" nut onto a 1½" bolt after a flatwasher and starwasher have been placed on the bolt. The flatwasher should be under the head of the bolt and the starwasher should be under the nut.

b) Place this bolt in the hub assembly as shown.

c) Tighten with a 7/16" open end wrench. Place the wrench on the HEAD of the bolt (not the nut). The starwasher will keep the nut from turning while tightening. **Do not overtighten.**

STEP 15: TO INSTALL GAMMA MATCHES

There are two gamma matches. One is for horizontal and the other is for vertical. They are both different and care must be taken to insure that both of them are installed in their respective places.

The overall length of the vertical gamma is 24¼ inches and is coded a black color. The horizontal gamma is 26¾ inches long with a brown color code.

Referring to Figure 9, the vertical gamma (black) will be attached to the vertical connector, the horizontal to the remaining connector.

After determining where each gamma is to be installed, follow these construction details:

a) Place the small end of one gamma rod into the hole of the swivel insert (Figure 6).

b) Attach the large flattened end of the gamma tube with the hole in it, to the lug on the connector bracket. Use hardware as shown in Figure 8. Tighten finger tight only.

c) Position the edge of the VERTICAL gamma fastener 2¾ inches from the joint as in Figure 6. Tighten all three screws on the gamma fastener.

d) In a similar manner: Position the edge of the HORIZONTAL gamma fastener 6¾ inches from the joint.

e) Tighten screw that was left loose in Step 15b.

STEP 16: MAST MOUNT ATTACHMENT

a) Insert ¼" x 1" bolts through two holes in top of mast mount. NOTE: One side of the mast mount has groove for square nut. Place ¼" square nuts on bolts.

b) At this point, measure from the back of the plastic hub on reflector (RED) end of boom a distance of 22" (Figure 11) and put a mark on boom. On this mark, locate the edge of the mast mount which is closest to the RED end.

c) If a short pipe or mast is available, it is recommended that it be fastened to the mast mount. This will enable you to better align the antenna spreaders with the mast.

d) Rotate boom in the mast mount until elements are lined up with the mast. Tighten the top two bolts.

e) Remove the temporary mast.

STEP 17: DRIVEN OUTER ELEMENT INSTALLATION

a) Place a 5/8" tube clamp over the slotted end of each of the four 5/8" O.D. inner driven elements . . . NOT THE RED END.

b) Locate the four ½ x 48" elements with the flattened ends. Measure 43-11/16" from the center of the hole and make a mark at this point.

c) Slide these four ½" O.D. aluminum outer elements into the inner elements of the driven sub-assembly. Insert them up to marks you have made.

d) Before tightening tube clamps, rotate outer element so that the flattened end of the tube is lined up with the flat side of the hub. Check to see that this aluminum tubing is on the unpainted end of the boom and NOT the red-coded end.

e) Take three of the four aluminum elements and install nardware on the tips of these as in Figure 14.

f) Install hardware on the tips of three fiberglass elements as in Figure 14 also.

g) On the two elements remaining (one fiberglass and the other aluminum) install hardware as shown in Figure 15. Notice that there are TWO flat washers installed on these.

h) Leave hardware loose.

STEP 18: REFLECTOR OUTER ELEMENTS INSTALLATION

a) Place a tube clamp on the slotted end of each of the four reflector inner elements (RED end of boom). See Figure 13. Leave clamps loose.

b) Locate the four fiberglass element rods. Measure 43-11/16" from center of hole in aluminum tip on fiberglass element and make a mark.

c) Slide each of the four fiberglass outer elements into the inner elements of the reflector sub-assembly. They should be inserted up to the mark you have made. (Figure 13).

d) Place reflector (RED) end of antenna on floor and rotate fiberglass elements such that flattened ends are parallel with floor.

e) Tighten 5/8" tube clamps securely.

STEP 19: WIRE INSTALLATION. Figures 19 & 20.

IMPORTANT

Extreme care must be exercised in stretching and marking the radiation wire. The dimension of 9'6½" is critical and should be held within 1/16". Proper operation of the antenna depends largely on the care taken in making this measurement. The wire length cannot be measured correctly when it is installed on the fiberglass elements. The wire **must** be measured and marked, stretched out **straight.** It is suggested that a flat surface be used for making this measurement, such as a sidewalk or floor. It is necessary to have a 50 foot tape measure to mark the wire.

Follow this procedure and refer to Figure 19.

a) Fasten one end of wire to a nail, or clamp the end in a vise.

b) At the opposite end, wrap the wire around a pair of pliers or a stick so the wire won't slip loose when pulling.

c) Pull on stick so wire stretches a few inches. If done correctly, wire will be perfectly straight.

d) Lay the tape measure next to the wire on the floor and mark the wire with a black magic marker or paint spot as shown.

Note: Put all five marks on the wire without moving the tape measure or wire. See Figure 19. The total length of wire from the first mark to the fifth should measure exactly 38'2".

e) "String" the wire around the fiberglass elements. Figure 20. Make sure the mark on the wire is in the center of the screw before tightening. (Figure 16). The fiberglass element which has 2 flatwashers in its tip, is the tip which will terminate the two free ends of the wire. Wrap both ends around the screw. One end should be under one flatwasher, the other end should be under the other flatwasher. See Figure 17. Note: The marks on both ends of the wire should be positioned in the center of the screw. See Fig. 17 & 20.

STEP 20:

Place the red plastic boom cap on the red coded end of the boom.

STEP 21:

Place the black plastic plug on the other end of the boom.

STEP 22:

After you have completed assembly, check to see if the wire is too tight. This will cause bowing as shown in Figure 18. To check this, have someone hold the antenna off the ground as shown. By sight, line up the wire. The wire closest to you and the one on the far side should cross the hub.

To adjust, first make sure you position the sharp bends of the wire under the washer, at the flattened end of each outer element. Then see if the mark on the ½" element is correct. If all this checks out and the element is still bowed, loosen 5/8" clamp as shown in Figure 13 and move the ½" element in 1/8" and re-tighten. Adjust all four spreaders equally. This should correct the bowing; if not, repeat once again. If wire is too loose and it sags, use the same method, extend all four elements 1/8" at a time.

STEP 23: CONNECTION OF ANTENNA

a) Connect two type RG8-U coax lines of a length long enough to reach your transceiver location. The vertical and horizontal connections are shown in Figure 9. The vertical coax is attached to receptacle marked "V" on switch console, the horizontal coax to the "H" receptacle on the switch console.

b) Using vinyl tape, tape the two cables to the mast at frequent intervals down along the length to prevent loosening by the wind.

c) Connect a length of 58U or 8U coax between the center "XMTR" terminal of the switch console box and your transceiver antenna terminal (any length).

PREPARING THE COAXIAL CABLES

To insure optimum results, we recommend that the vertical and horizontal coax be cut to the same length and to follow the prescribed lengths listed below. By using the lengths described below, the best horizontal to vertical separation will be achieved.

Connectors should be installed tightly and carefully so that they do not come loose. Tighten all connectors with pliers. Make sure to check that the connectors don't short out when the cables are wiggled after they are installed. (See special insert on the proper assembly of the connectors.)

LENGTH OF COAX TO BE USED

Coax cables using solid dielectric deteriorates in time and is not recommended, but lengths should be any multiple of 12 feet if this is to be used. If RG58U or RG8U foam insulated coax is used, lengths of each coax should be a multiple of 14 feet.

NOTE: In order to achieve the extra gain in the horizontal polarization over the vertical, it is recommended that the antenna be situated 36-feet above the ground or more if this is legally possible.

ON THE AIR CHECKS

With the V-H switch on V, turn the antenna with the rotor to attempt to pick up

a signal coming in about 6 S-Units. Carefully determine that the antenna is pointing to him by noting slight decreases as you rotate each side of him. Then switch to horizontal (H). If he is vertically polarized, his signal should drop at least 3 S-Units. As you rotate the antenna in either the vertical or horizontal mode, you will notice that the signal is greatly diminished at the rear of the beam.

Try doing the same thing to the other stations; similar minimum drops should be experienced. If you can contact another PDL-equipped station, you will note that if he also switches to horizontal, you will be able to carry on a very improved conversation.

Generally on skip, signals will come in better on horizontal than vertical. The manifold benefits of the PDL will be more apparent as you learn to use it. Often when man-made noise is rampant, switching to horizontal is the only alternative to getting out.

Sometimes depending on the installation, the V.S.W.R. on the horizontal mode will be a little high. This can usually be corrected by sliding the gamma rod out of the gamma tube ½".

FIGURE 1

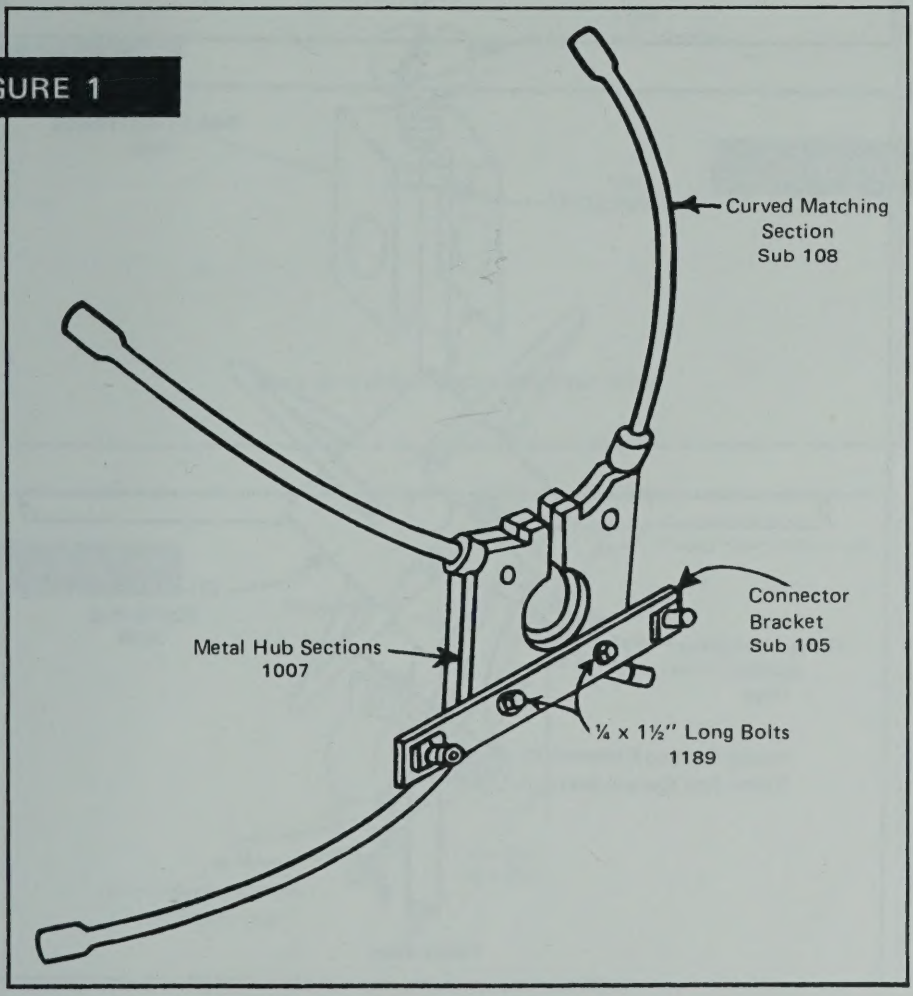


FIGURE 2

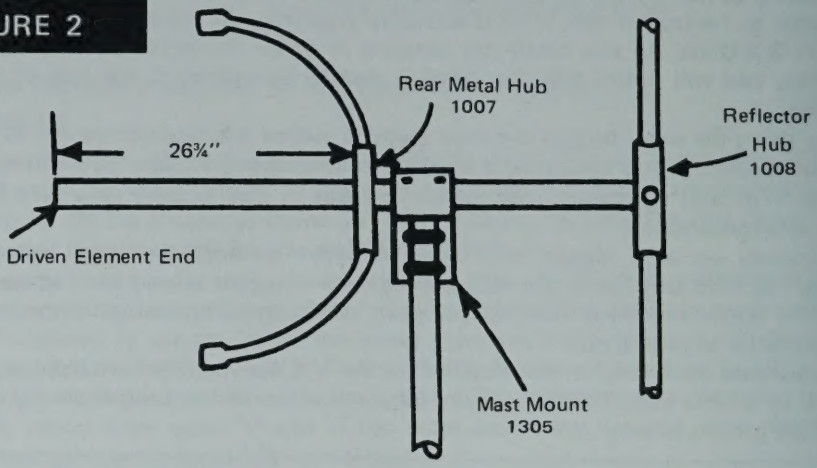


FIGURE 3

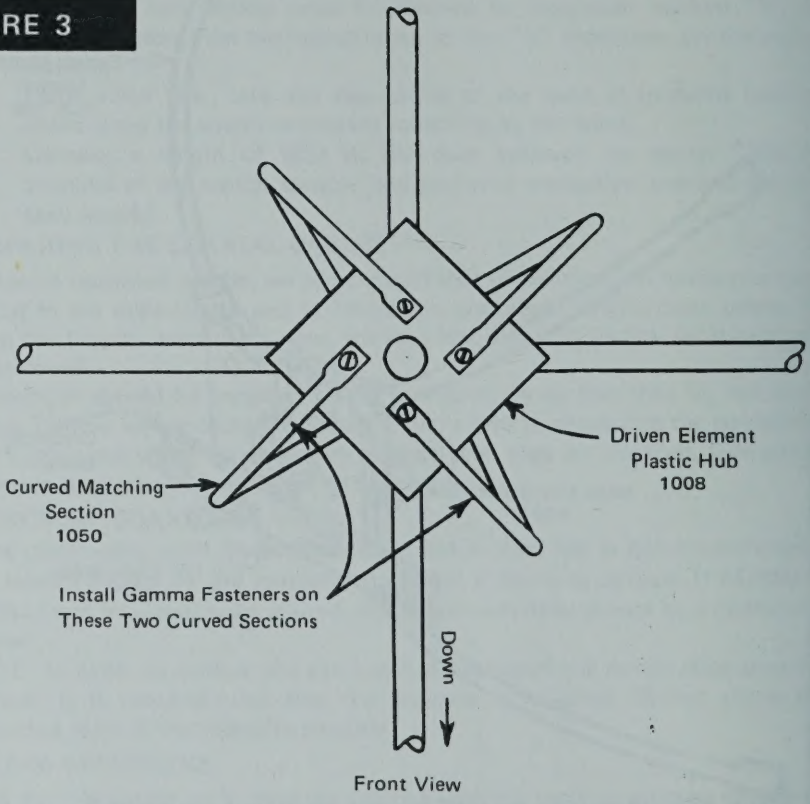


FIGURE 4

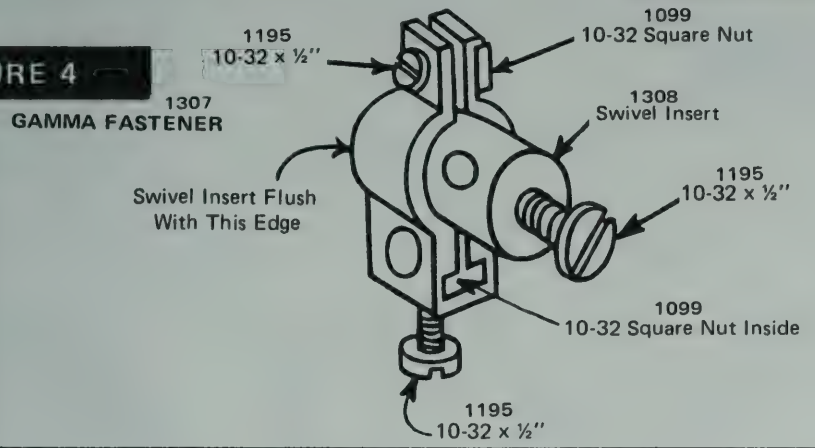


FIGURE 5

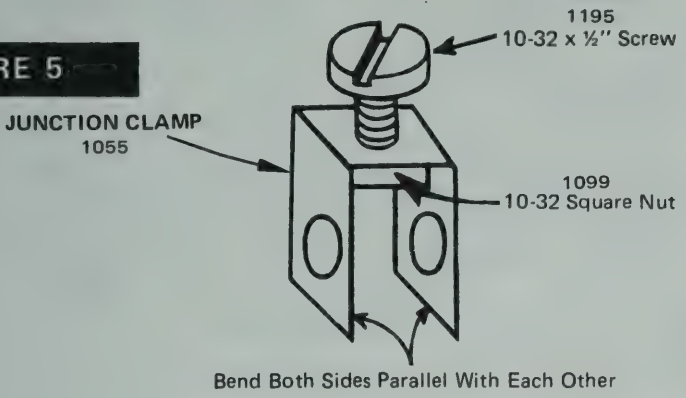


FIGURE 6

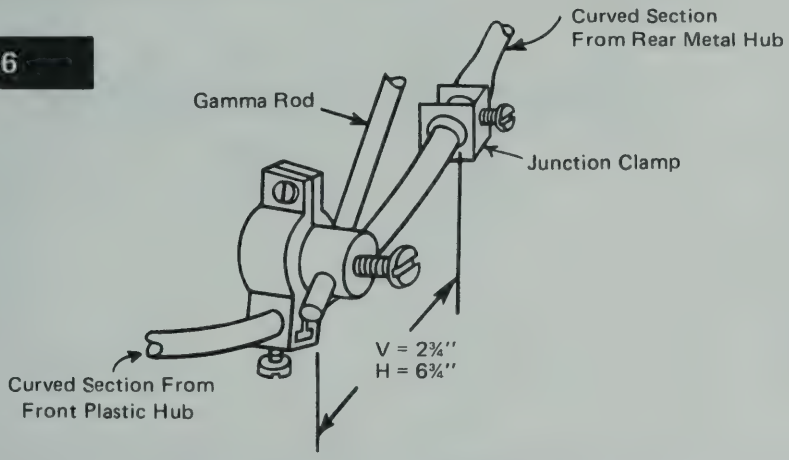


FIGURE 7

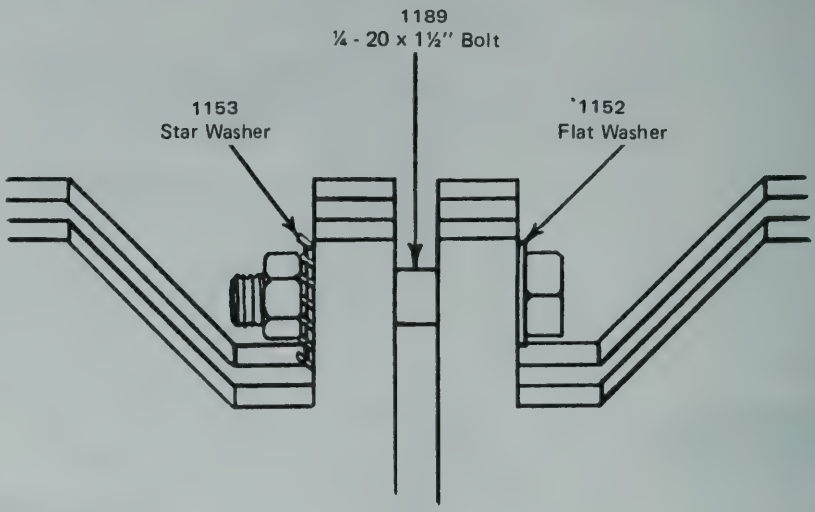


FIGURE 8

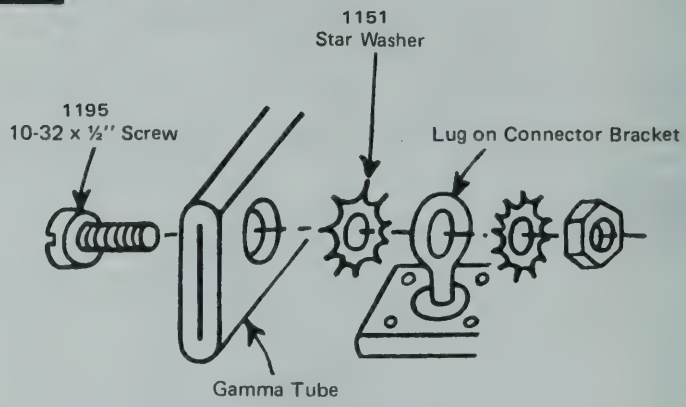


FIGURE 9

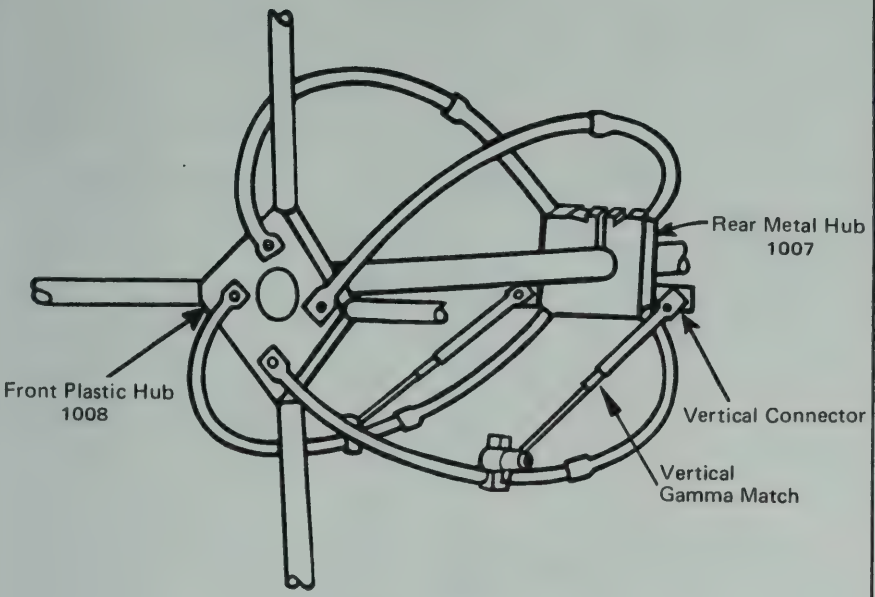

Rear Metal Hub
1007
Front Plastic Hub
1008
Vertical Connector
Vertical
Gamma Match

FIGURE 10

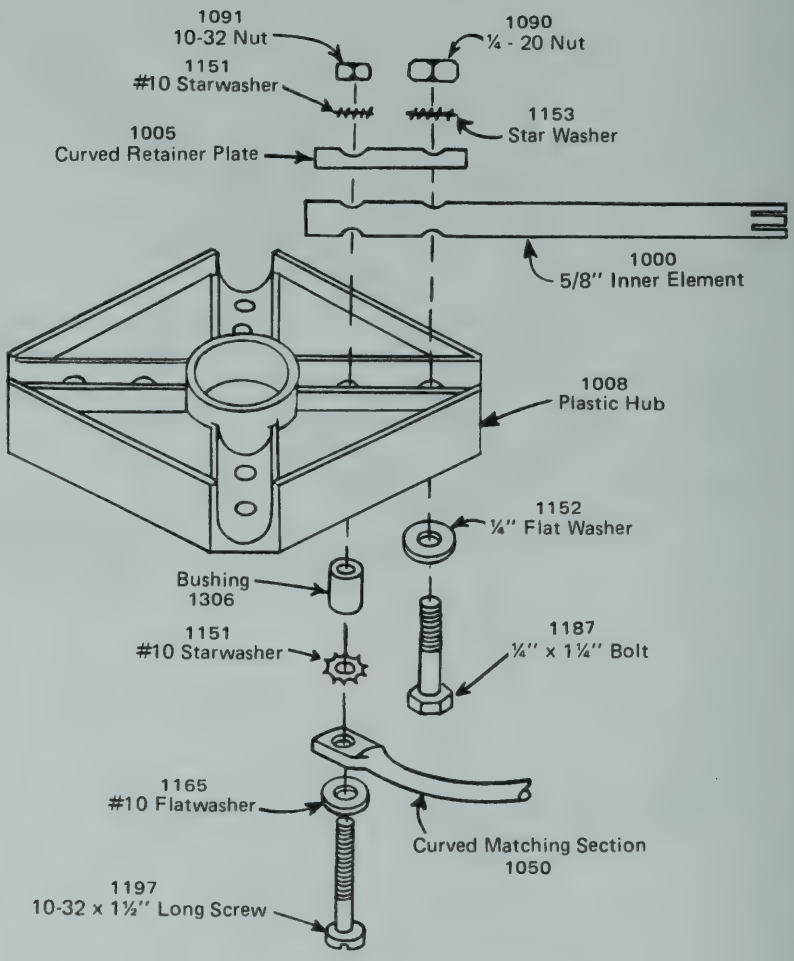

1091
10-32 Nut
1090
¼ - 20 Nut
1151
#10 Starwasher
1153
Star Washer
1005
Curved Retainer Plate
1000
5/8" Inner Element
1008
Plastic Hub
1152
¼" Flat Washer
Bushing
1306
1151
#10 Starwasher
1187
¼" x 1¼" Bolt
1165
#10 Flatwasher
Curved Matching Section
1050
1197
10-32 x 1½" Long Screw

FIGURE 11

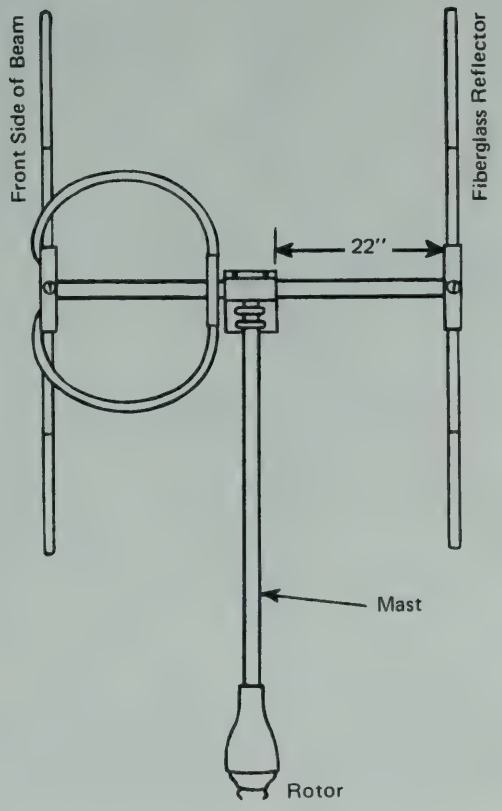


FIGURE 13

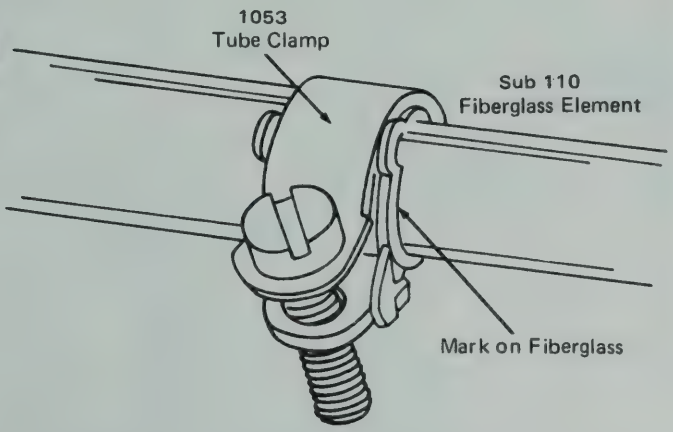
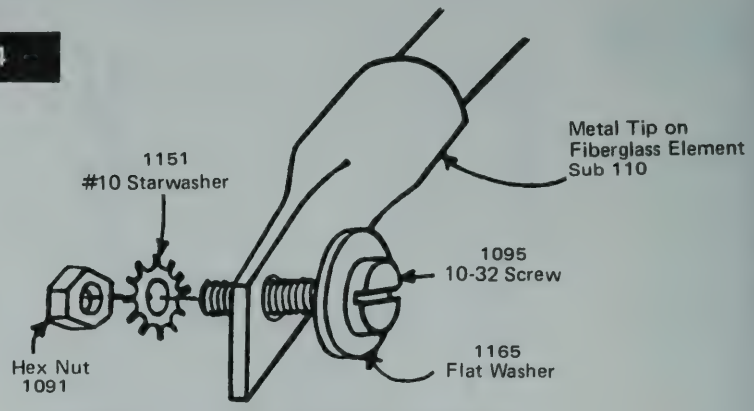
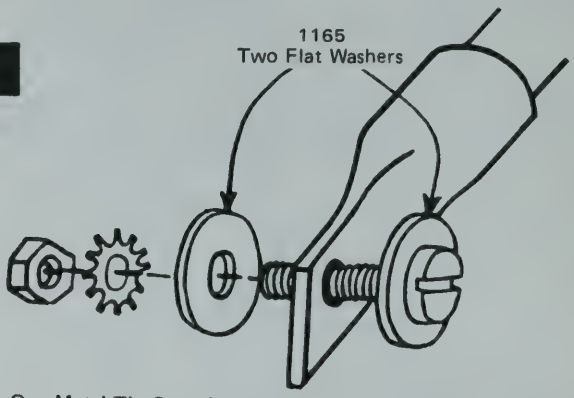


FIGURE 14



Three Metal Tips Contain Hardware in This Order

FIGURE 15



One Metal Tip Contains Hardware in This Order

FIGURE 16

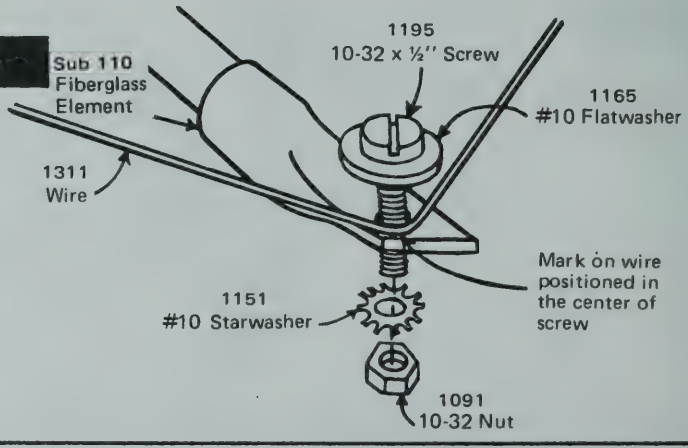


FIGURE 17

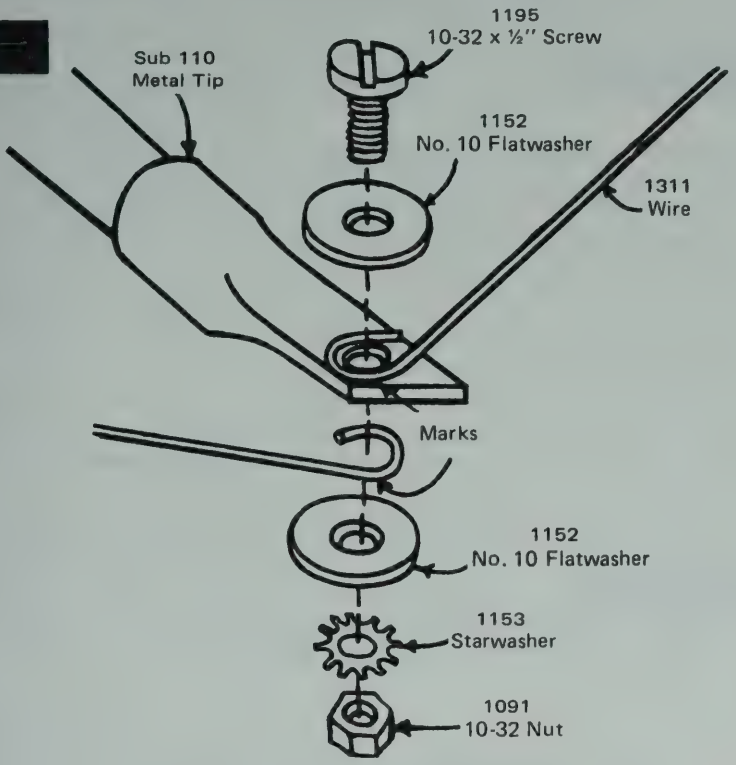


FIGURE 18

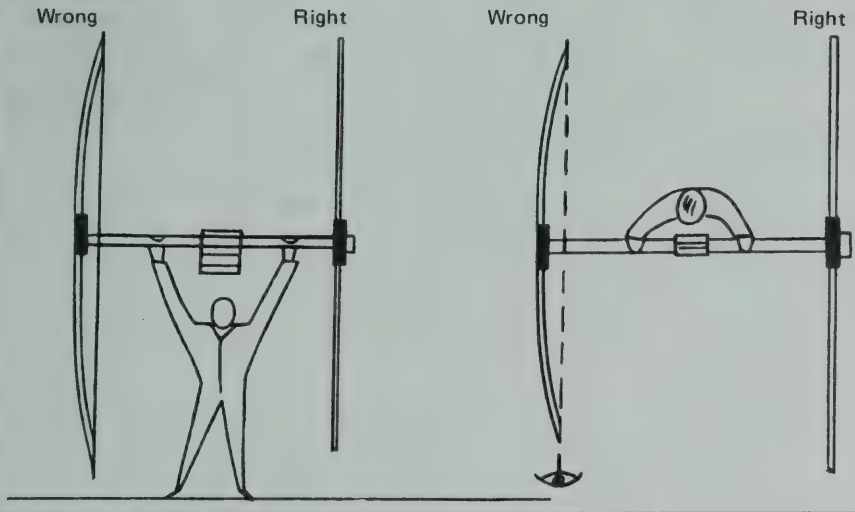


FIGURE 19

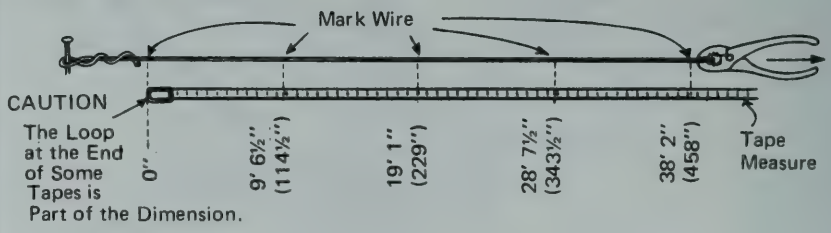
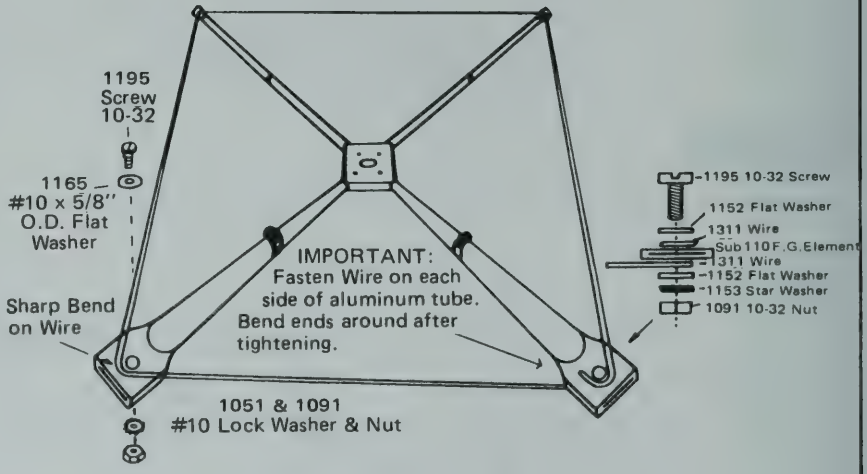


FIGURE 20



GAMMA ADJUSTMENTS FOR THE PDL-II

All S.W.R. measurements and adjustments should be made without using any switchboxes or any other devices in the coax line that is being checked. Connect the S.W.R. meter between the transmitter and the vertical or horizontal coax, whichever gamma you are adjusting.

It would be best if the S.W.R. readings are taken with the antenna mounted at its approximate operating height. An antenna being too close to the ground will change the S.W.R. readings. If the antenna must be tuned near the ground, it would be best if the antenna were aimed straight up into the air with no objects surrounding it. This will approximate the conditions when the antenna is mounted at its operating height.

Note: Do not stand near the antenna while making S.W.R. measurement. This will affect the readings.

For accurate S.W.R. readings, it is advisable to use ½ wave multiples of your coax line. If you are using regular RG-8U coax, it should be cut in multiples of 12 feet. If you are using RG-8U low loss foam type, the multiple should be 14 feet.

The gamma setting for the lowest S.W.R. consists of two adjustments on each (horizontal and vertical) gamma.

The vertical and horizontal adjustments will not interact. In other words, you may make adjustments on the vertical gamma without affecting the horizontal match and vice-versa. Refer to Figures 4 and 6 in the AV-120-2 instruction manual.

The two gamma adjustments are:

(1) The location of the gamma fastener on the curved section (normally set at 1¼" from the edge of expanded joint).
(2) The distance the ¼" gamma rod is inserted into the plastic of the gamma tube (not shown in Fig.).

(1) Before making any adjustments, check the S.W.R. at the factory recommended settings and record the reading on paper.

(2) Remove the spring clamps on the gamma tube and loosen the 10-32 screw in the swivel insert. (Fig. 4)

(3) Adjust the gamma rod by sliding the rod in or out of the plastic tube ¼" at a time, taking readings after each adjustment. The swivel insert screw should be tightened slightly after each adjustment so good contact is made. When the lowest S.W.R. has been achieved, temporarily lock into this position at the plastic end.

(4) If S.W.R. is still too high, loosen the screw that holds the gamma fastener to the curved section and also the swivel insert screw again.

(5) Adjust by sliding the gamma fastener back or forth ½" at a time taking S.W.R. checks after each ½" adjustment. Adjust until the lowest S.W.R. is obtained. If the lowest S.W.R. attained is still too high, repeat Step 3 followed by Step 4.

(6) These two steps can be repeated as many times as it takes to obtain a good match.

(7) After all adjustments have been made, retighten all screws and install the spring clamps.

ANTENNA TESTING VARIABLES

From time to time, many CBer's are heard to make the remark that a particular antenna is not living up to the advertised performance figures such as gain, S.W.R., or front-to-back ratio. These statements are usually founded on their personal field tests; often based on comparisons between one antenna and another. The disparity in the results between the tests of the CBer and the factory usually stems from the conditions under which the tests were run. The following is a short discussion of some of the variable conditions that do occur and how they affect antenna performance.

EFFECT OF OTHER ANTENNAS

When two antennas are mounted near each other (even if they are used for different frequencies), a coupling usually results which in some way alters their operation. This coupling is even more pronounced when the antennas are mounted less than one wavelength apart. So, if another antenna is less than 36 feet from your CB antenna, there is a good chance that it changes its performance in some way.

THE EFFECT OF METAL STRUCTURES

Not only antennas, but water towers, power lines, buildings, or any material of a metallic nature has the ability to misdirect transmission. Sometimes these obstacles will act as directors and sometimes as reflectors - causing the signal to increase or decrease in the intended direction.

Complaints of poor front-to-back ratio or lower than expected gain can usually be traced to this above circumstance - especially in beam-type operation.

SIGNAL INTENSITY

The signal strnegth of a remote transmitting station can never be assumed to be of the same strength as in previous transmissions. Signals of incoming stations should be recalibrated to the antennas being compared. For this reason, you cannot take down one antenna, put up another one week later, and expect to make accurate measurements. If the stations being used are using beam type antennas, a slight change in the beams' directions can also be critical. Contacts with mobiles are even less valid. A movement of five feet sometimes makes measurable differences in mobile communications.

S METER CALIBRATION

Depending upon the CB set, an S meter is calibrated so that one S unit is equal to 6 db. Therefore, an antenna responsible for 1 S unit gain over another has also about 6 db gain over that other antenna. Some S meters, however, are calibrated at only 3 db per S unit and others at 3 or 4 at the low end, and 6 or 7 at the top of the scale.

Another problem encountered with S meters is the ability to measure high strength inputs. Some bounce back at a powerful signal and appear erratic in operation even reading lower on the scale with an increased signal.

COAX AND CONNECTORS

The quality of the coax and connectors and especially the soldering of the coax to the connector can affect S.W.R. and gain. Many times an unsuspecting CBer will buy a low grade coax and lose 2 or 3 db after paying good money for an expensive transceiver and antenna. A quick check for good coax and connections can be run by substituting a dummy load on the antenna end of the coax. If all is right, the S.W.R. with the dummy load should be a 1 to 1 match.

CRYSTAL VARIATIONS

Mr. A. and Mr. B. are neighbors and they are comparing the performance of their antennas by their ability to transmit to Mr. C. about 20 to 30 miles away. If Mr. A. has a crystal slightly high on frequency, he might show a weaker signal to Mr. C. even though his operation has more power. This would make A's antenna seem inferior to B's. This problem can be eliminated by Mr. C's having a tunable receiver on his transceiver to match A's variation.

ANTENNA HEIGHT

Whenever antennas are being compared, they should be installed at the proper distance above the ground and preferably in an open field. This operation is not even legal for CB'ing when using a horizontal beam, because the proper distance above ground for this mode of transmission is 36 feet or more. Only the test of a vertical antenna may be run at a legal height of 20 feet in an open field.

TIME VARIATION

Any test of antennas should be performed with a time variation of about 15 minutes or less to eliminate variations due to tropospheric shifts and other changes that affect performance.

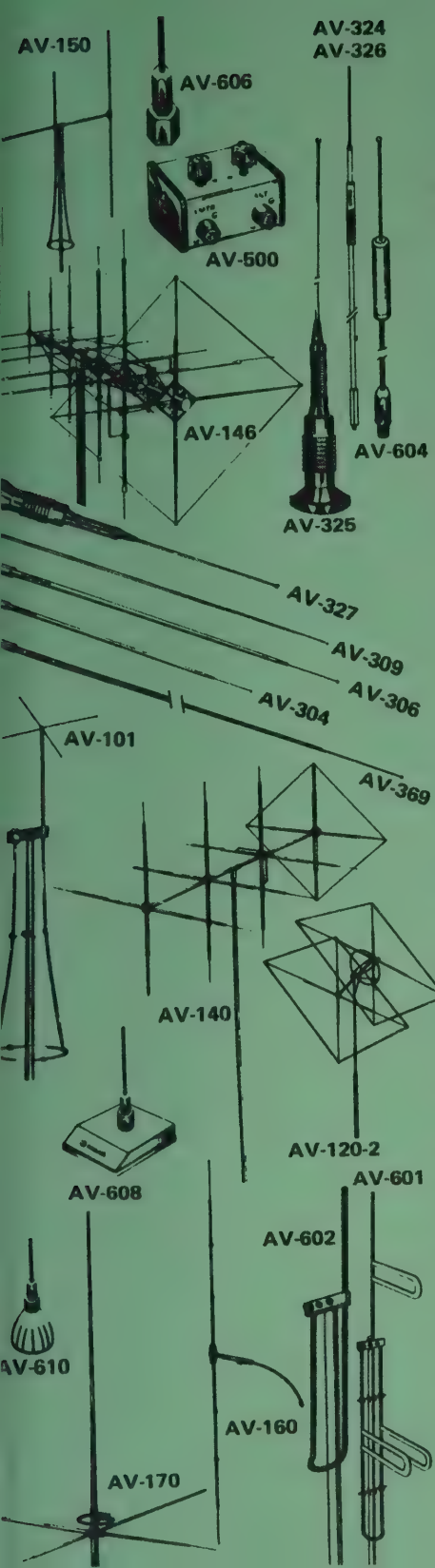
GUY WIRES AND SUPPORTING STRUCTURES

Guy wires should preferably be of the non-metallic type using ski tow rope or other plastic lines. If metallic guy wires are used, they should be broken up at uneven intervals along their length to avoid interference and possible high S.W.R. In many cases, a manufacturer intends his antenna to be mounted on a metal mast or tower and in some cases, the mast or tower is used as a radiating element.

PROPER CONSTRUCTION

If they could, manufacturers would ship all antennas fully assembled in order to eliminate mistakes in construction often found in antenna installations. Even the best instructions are sometimes mis-read and an antenna condemned only because of an error in assembly. If an antenna does not perform up to par, contact your local distributor or dealer, and if he can't help you, call the manufacturer. Chances are that somebody will get it working.

These are by no means all of the possible variations to consider in antenna measurements; however, they are some of the most important and understanding them will certainly be to the CBer's benefit and may save time in finding a trouble source.



AV-101 ASTRO-PLANE Base Station, 4.46 db, over Isotropic

AV-120-2 PDL II With New "Orbital Gamma Match" And AV-501 Switchbox, Dual Polarity

AV-130 STACKING KIT For 2 AV-120's Complete With Harness

AV-140 MOONRAKER Base Station With Switchbox, 14.5 db, over Isotropic

AV-146 MOONRAKER 6 Base Station With AV-502 Switchbox 17 db over Isotropic

AV-150 ASTRO-BEAM Base Station, 40 db Front to Back, 11 db over Isotropic

AV-160 RAMROD Multi-Purpose Base Station (Tunable 27-170 MHz)

AV-170 SIGMA 5/8 Base Station—Full 5/8 Wave Length, 5.14 db Over Isotropic

AV-304 4' Fiberglass RACER w/Tunable Tip

AV-306 6' Fiberglass RACER w/Tunable Tip

AV-309 96" Fiberglass RACER Whip

AV-324 4' HIPPO Top Loaded Mobile Antenna—250 Watts Maximum Power

AV-325 5' HIPPO Base Loaded Mobile — 500 Watts Maximum Power

AV-326 6' HIPPO Top Loaded Mobile Antenna—350 Watts Maximum Power

AV-327 RACER 27 Base Loaded Mobile With Spring, High Durability Tunable Whip

AV-369 GATOR-WHIP (Tunable 25-40 MHz)

AV-601 25-50 & 140-174 MHz Base Station Monitor (Dual Banded)

AV-602 440-470 MHz Base Station Monitor With 30" Mast

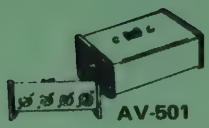
AV-604 25-50 & 140-174 MHz Mobile Monitor 3/8 Thread (Dual Band)

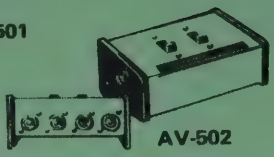
AV-606 Same as AV-604 With AV-506 Mount And 17' Coax

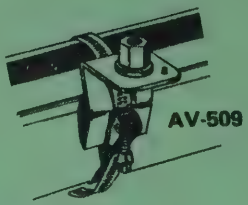
AV-608 Same as AV-604 With AV-508 Mount And 17' Coax

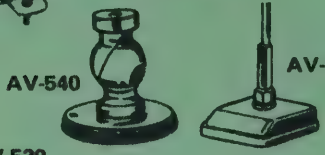
AV-610 Same as AV-604 With AV-503 Mount And 17' Coax

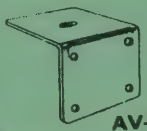
AV-500 500 Watt AVANTI Matchbox

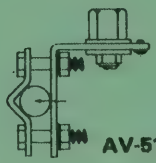












AV-501 CS-1 Coaxial Switchbox

AV-502 CS-2 Coaxial Switchbox For Use With Standby Antenna

AV-503 RACER 1/2" SNAP MOUNT With Standard 3/8-24 Thread

AV-504 Co-Phasing Harness For Installation Of 2 Mobile Antennas

AV-506 3/8-24 Adapter For Use With AV-521's Or Other Trunk Mounts

AV-508 AV-506 Installed In AV-521 No-Hole Trunk Lid Mount

AV-509 Bumper Strap Mount For Compact Cars 3/8-24 Threads

AV-510 Bumper Strap Mount For Standard Cars 3/8-24 Threads

AV-514 SUCTION CUP TIE DOWN—No Tools Necessary For Installation

AV-515 CAMPER Mount With 3/8-24 Threads—Fold-Down Feature

AV-516 TRUCK Side Mounted Mirror Bracke With 3/8-24 Threads

AV-517 CAMPER Bracket Mount With 1/2" Hole For AV-327

AV-521 No-Hole Trunk Lid Mount

AV-527 AV-327 With AV-521 No Hole Trunk Mount

AV-540 Cast Aluminum Swivel Ball Mount 3/8-24 Thread

AV-701 Special PROTECTIVE SPRING For AV-304's, AV-306's and AV-328's.

PK-120 PDL (AV-120) Power & Gain Kit Also Adds 1 db Gain For Older PDL's!

AV-530 Rubber Shock 3/8-24 Threaded Medium Duty Spring

AV-328 Fazer Top Loaded Mobile

AV-526 4' Hippo Mirror Mount Co-phase Package

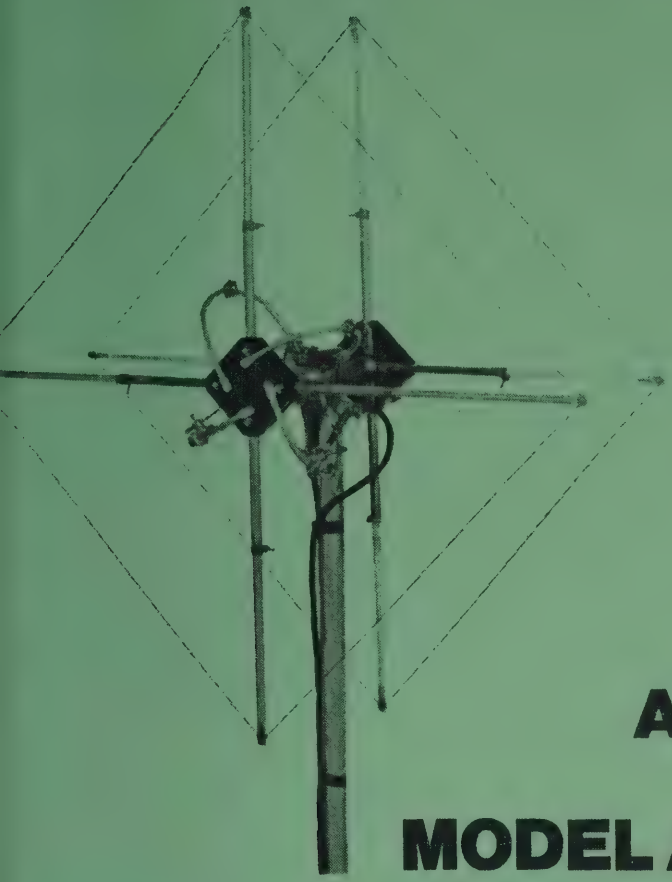
AV-528 S.S. Fazer Stainless Steel Top-Loaded Mirror Mount Co-phase Package

AV-529 4' Racer Mirror Mount Co-phase Package

avanti

RESEARCH AND DEVELOPMENT, INC.
340 Stewart Ave., Addison, Illinois 60101

INSTRUCTION MANUAL



PDL-II ANTENNA

MODEL AV-120-2

avanti

PART NO. 1448

IMPORTANT INFORMATION PLEASE READ CAREFULLY

LIMITED WARRANTY

AVANTI R&D, INC. guarantees the materials and workmanship under normal use for one year from date of purchase. AVANTI R&D, INC. will repair or replace parts which are found defective in either materials or workmanship at no charge to the customer. In no event shall AVANTI R&D, INC. be liable for special or consequential damage. No claim under this warranty will be honored if the equipment covered has been misused, tampered with, or changed in any way. This warranty is in lieu of all others, expressed or implied.

AVANTI R&D, INC. LIMITED WARRANTY REGISTRATION

It is not necessary to return a warranty registration card. However, **SAVE YOUR SALES RECEIPT.** Should a warranty claim ever become necessary, simply send your sales receipt, or a copy of the receipt, along with the defective part to AVANTI R&D, INC. It is suggested that you simply staple or tape your sales receipt to your instruction booklet for future reference. Your sales receipt is your proof of purchase date.

HANDLING OF WARRANTY CLAIMS FOR FASTEST SERVICING

All warranty claims should be directed to AVANTI R&D, INC., 340 Stewart Avenue, Addison, Illinois 60101 in order to expedite prompt service. Any part that is felt to be defective in either materials or workmanship should be sent prepaid to AVANTI R&D, INC. for evaluation, repair or replacement. It is not necessary to return an entire unit, but only those part(s) that are defective. All returned units will be shipped prepaid.

Mention this no.
if you contact us
about your purchase.

PARTS LIST

AV-120
PDL-27-A

NOTE: CHECK ALL PARTS WITH THIS LIST BEFORE DOING ANYTHING. MAKE SURE YOU KNOW WHAT EACH PART IS AND WHAT IT LOOKS LIKE.

Part No.	QTY.	DESCRIPTION	PRICE
HARDWARE			
Sub 111	1	Kit – Complete	$8.80
1195	20	10-32 x ½" Panhead Screws	.11
1196	2	10-32 x ¾" Panhead Screws	.11
1197	4	10-32 x 1½" Panhead Screws	.11
1165	14	#10 Flatwashers (5/8" O.D.)	.06
1151	22	#10 External Starwashers	.06
1091	16	10-32 Hex Nuts	.06
1099	8	10-32 Square Nuts	.06
1188	2	¼-20 x 1" Bolts	.17
1187	14	¼-20 x 1¼" Bolts	.17
1189	3	¼-20 x 1½" Bolts	.17
1152	17	¼" Flatwashers	.06
1153	17	¼" External Starwashers	.06
1090	17	¼-20 Hex Nuts	.06
1098	2	¼-20 Square Nuts	.06
1306	4	5/16 x 3/8 Bushings	.27
1055	4	Junction Clamps	.55
1307	2	Gamma Fasteners	1.10
1308	2	Gamma Fastener Swivel Inserts	.72
1053	8	Adjustable 5/8" Pipe Clamps	.27
1004	1	Black Plastic Boom Plug	.27
1003	1	Red Plastic Boom Cap	.27
1005	8	Special Curved Retainer Plates	.55
1071	2	5/16 x 1¾" U-Bolts	.82
1156	4	5/16" External Starwashers	.06
1092	4	5/16" Hex Nuts	.06
PARTS			
AV-501	1	H-V Switch Box	12.05
1449	1	1-5/8" x 4'10" Boom Tube	3.85
1000	8	5/8" x 3' Elements, Inner	3.85
1001	4	½" x 4' Driven Elements, Outer	1.65
Sub 110	4	½" X 4' Fiberglass, Reflector Elements, Outer	3.85
1008	2	5" x 5" Plastic Hubs	3.85
1311	2	Coils Radiation Wire	3.85
1305	1	Mast Mount	3.85
1007	2	Metal Hub Halves	1.65
1050	4	Curved Section, One End Flattened	1.10
Sub 108	4	Curved Section, One End Expanded	1.10
Sub 105	1	Connector Bracket	3.85
Sub 106	1	Gamma Match – 24-¼" Coded Black	3.30
Sub 109	1	Gamma Match – 26-¾" Coded Brown	3.30

TOOLS NEEDED

1 Medium ¼" Screwdriver
1 Adjustable Wrench or ½" Open End
2 7/16 Open End & 3/8 Open End Wrench
1 Pliers
1 Yard Stick
50' Tape Measure
6" Ruler

ASSEMBLY INSTRUCTIONS FOR MODEL AV-120-2

STEP 1: DRIVEN ELEMENT SUB-ASSEMBLY

a) Turn to Figure 10.

b) Take four 5/8" O.D. tubes (spreaders). Put the ends with two holes into each of the corner slots of the black hub.

c) Insert ¼-20 x 1¼" bolts with ¼" flat washers through plastic hub in outer holes only. On the other side, place curved retainer plates over bolts. Put nuts and starwashers on bolts and tighten.

STEP 2: REFLECTOR SUB-ASSEMBLY

a) Turn to Figure 10.

b) Duplicate the DRIVEN ELEMENT SUB-ASSEMBLY procedure with the remaining hub and four 5/8 O.D. tubes. EXCEPT insert ¼-20 x 1¼" bolts through all eight holes in the hub.

c) BE SURE to use flat washers on plastic hub and lockwashers on metal retainer plates.

d) Tighten all bolts securely.

STEP 3: BOOM ATTACHMENT

a) Insert RED painted end of large diameter aluminum boom tube into REFLECTOR sub-assembly just completed. This is the assembly with all 8 bolts in hub.

b) Align the hole on side edge of black hub with hole in boom.

c) Insert 10-32 x ¾" screw into hole in edge of hub, pass the screw through the hub and through hole in boom.

d) Hold 10-32 nylon self-locking insert nut inside of boom tube with fingers and tighten with screwdriver. Boom will extend 1" beyond hub.

e) At this point, slip mast mount over the boom. IT IS IMPORTANT TO DO THIS NOW as later you could not get mast mount past the hubs.

f) Set assembly aside.

STEP 4: CONSTRUCTION OF THE CURVED MATCHING SECTION IN FIGURE 1

a) Place the ends with holes of the four expanded curved sections in the two metal hub halves.

b) Position the connector bracket on the hub as shown. Use ¼ x 1½" bolts to fasten both hub halves and the connector bracket together. Insert ¼ x 1¼" bolts in the two remaining holes. Use flatwashers under the heads of the bolts and a ¼" starwasher under each nut.

NOTE: TIGHTEN NUTS ONLY FINGER TIGHT.

c) Slide this assembly 26¾" onto boom. The curved sections should be pointing away from the mast mount (or toward the front). Measurement is taken from the edge of the boom to the face of the metal hub as shown in Figure 2. Position the connector bracket parallel with the horizontal spreaders of the reflector.

d) Place driven element sub-assembly (the one set aside in Step 1) onto the remaining end of boom, the side printed AVANTI R&D surface to the outside.

e) Align hole on side edge of hub with hole in boom.

f) Insert 10-32 x ¾" screw into hole in edge of hub, through hub, and through the hole in the boom.

g) Place 10-32 nylon self-locking insert nut on screw and tighten as in Step 3. Boom will be flush with hub.

STEP 5: INSTALLING THE CURVED MATCHING SECTIONS TO THE PLASTIC HUB

a) Turn to Figure 10. Figures 3, 7, and 9 will also be helpful.

b) Insert 4 blushings into the 4 remaining holes of the driven element hub.

c) Attach the four curved sections to the driven element hub as shown in Figure 10. Use all starwashers in their proper place as per drawing.

d) Leave hardware loosely fastened.

STEP 6:

See Figure 4. Prepare gamma fasteners as shown. Leave all hardware loose. Swivel insert should be flush with the edge of the gamma fastener after insertion.

STEP 7:

Prepare four junction clamps as shown in Figure 5. Bend both sides of the clamp so the sides are parallel with each other.

STEP 8:

Place gamma fasteners on both curved matching sections that point downward as shown in Figures 3 & 6. Leave loose.

STEP 9:

After sliding the gamma fasteners onto the curved sections, slide on a junction clamp - one clamp on each of the four joints as in Figures 3 & 6.

STEP 10:

Push the curved sections coming from the front plastic hub together with the curved sections which are attached to the rear metal hub as in Figures 3 & 6.

STEP 11:

Place the junction clamps over the enlarged part of the joints and tighten the screw until the joint is tight. See Figure 6.

STEP 12:

Tighten all other bolts and nuts on the metal hub.

STEP 13:

Tighten the 4 screws left loose in Step 5 (d).

STEP 14: TO SECURE THE METAL HUB TO THE BOOM. Figure 7.

a) Start a ¼" nut onto a 1½" bolt after a flatwasher and starwasher have been placed on the bolt. The flatwasher should be under the head of the bolt and the starwasher should be under the nut.

b) Place this bolt in the hub assembly as shown.

c) Tighten with a 7/16" open end wrench. Place the wrench on the HEAD of the bolt (not the nut). The starwasher will keep the nut from turning while tightening. **Do not overtighten.**

STEP 15: TO INSTALL GAMMA MATCHES

There are two gamma matches. One is for horizontal and the other is for vertical. They are both different and care must be taken to insure that both of them are installed in their respective places.

The overall length of the vertical gamma is 24¼ inches and is coded a black color. The horizontal gamma is 26¾ inches long with a brown color code.

Referring to Figure 9, the vertical gamma (black) will be attached to the vertical connector, the horizontal to the remaining connector.

After determining where each gamma is to be installed, follow these construction details:

a) Place the small end of one gamma rod into the hole of the swivel insert (Figure 6).

b) Attach the large flattened end of the gamma tube with the hole in it, to the lug on the connector bracket. Use hardware as shown in Figure 8. Tighten finger tight only.

c) Position the edge of the VERTICAL gamma fastener 2¾ inches from the joint as in Figure 6. Tighten all three screws on the gamma fastener.

d) In a similar manner: Position the edge of the HORIZONTAL gamma fastener 6¾ inches from the joint.

e) Tighten screw that was left loose in Step 15b.

STEP 16: MAST MOUNT ATTACHMENT

a) Insert ¼" x 1" bolts through two holes in top of mast mount. NOTE: One side of the mast mount has groove for square nut. Place ¼" square nuts on bolts.

b) At this point, measure from the back of the plastic hub on reflector (RED) end of boom a distance of 22" (Figure 11) and put a mark on boom. On this mark, locate the edge of the mast mount which is closest to the RED end.

c) If a short pipe or mast is available, it is recommended that it be fastened to the mast mount. This will enable you to better align the antenna spreaders with the mast.

d) Rotate boom in the mast mount until elements are lined up with the mast. Tighten the top two bolts.

e) Remove the temporary mast.

STEP 17: DRIVEN OUTER ELEMENT INSTALLATION

a) Place a 5/8" tube clamp over the slotted end of each of the four 5/8" O.D. inner driven elements . . . NOT THE RED END.

b) Locate the four ½ x 48" elements with the flattened ends. Measure 43-11/16" from the center of the hole and make a mark at this point.

c) Slide these four ½" O.D. aluminum outer elements into the inner elements of the driven sub-assembly. Insert them up to marks you have made.

d) Before tightening tube clamps, rotate outer element so that the flattened end of the tube is lined up with the flat side of the hub. Check to see that this aluminum tubing is on the unpainted end of the boom and NOT the red-coded end.

e) Take three of the four aluminum elements and install nardware on the tips of these as in Figure 14.

f) Install hardware on the tips of three fiberglass elements as in Figure 14 also.

g) On the two elements remaining (one fiberglass and the other aluminum) install hardware as shown in Figure 15. Notice that there are TWO flat washers installed on these.

h) Leave hardware loose.

STEP 18: REFLECTOR OUTER ELEMENTS INSTALLATION

a) Place a tube clamp on the slotted end of each of the four reflector inner elements (RED end of boom). See Figure 13. Leave clamps loose.

b) Locate the four fiberglass element rods. Measure 43-11/16" from center of hole in aluminum tip on fiberglass element and make a mark.

c) Slide each of the four fiberglass outer elements into the inner elements of the reflector sub-assembly. They should be inserted up to the mark you have made. (Figure 13).

d) Place reflector (RED) end of antenna on floor and rotate fiberglass elements such that flattened ends are parallel with floor.

e) Tighten 5/8" tube clamps securely.

STEP 19: WIRE INSTALLATION. Figures 19 & 20.

IMPORTANT

Extreme care must be exercised in stretching and marking the radiation wire. The dimension of 9'6½" is critical and should be held within 1/16". Proper operation of the antenna depends largely on the care taken in making this measurement. The wire length cannot be measured correctly when it is installed on the fiberglass elements. The wire **must** be measured and marked, stretched out **straight.** It is suggested that a flat surface be used for making this measurement, such as a sidewalk or floor. It is necessary to have a 50 foot tape measure to mark the wire.

Follow this procedure and refer to Figure 19.

a) Fasten one end of wire to a nail, or clamp the end in a vise.

b) At the opposite end, wrap the wire around a pair of pliers or a stick so the wire won't slip loose when pulling.

c) Pull on stick so wire stretches a few inches. If done correctly, wire will be perfectly straight.

d) Lay the tape measure next to the wire on the floor and mark the wire with a black magic marker or paint spot as shown.

Note: Put all five marks on the wire without moving the tape measure or wire. See Figure 19. The total length of wire from the first mark to the fifth should measure exactly 38'2".

e) "String" the wire around the fiberglass elements. Figure 20. Make sure the mark on the wire is in the center of the screw before tightening. (Figure 16). The fiberglass element which has 2 flatwashers in its tip, is the tip which will terminate the two free ends of the wire. Wrap both ends around the screw. One end should be under one flatwasher, the other end should be under the other flatwasher. See Figure 17. Note: The marks on both ends of the wire should be positioned in the center of the screw. See Fig. 17 & 20.

STEP 20:

Place the red plastic boom cap on the red coded end of the boom.

STEP 21:

Place the black plastic plug on the other end of the boom.

STEP 22:

After you have completed assembly, check to see if the wire is too tight. This will cause bowing as shown in Figure 18. To check this, have someone hold the antenna off the ground as shown. By sight, line up the wire. The wire closest to you and the one on the far side should cross the hub.

To adjust, first make sure you position the sharp bends of the wire under the washer, at the flattened end of each outer element. Then see if the mark on the ½" element is correct. If all this checks out and the element is still bowed, loosen 5/8" clamp as shown in Figure 13 and move the ½" element in 1/8" and re-tighten. Adjust all four spreaders equally. This should correct the bowing; if not, repeat once again. If wire is too loose and it sags, use the same method, extend all four elements 1/8" at a time.

STEP 23: CONNECTION OF ANTENNA

a) Connect two type RG8-U coax lines of a length long enough to reach your transceiver location. The vertical and horizontal connections are shown in Figure 9. The vertical coax is attached to receptacle marked "V" on switch console, the horizontal coax to the "H" receptacle on the switch console.

b) Using vinyl tape, tape the two cables to the mast at frequent intervals down along the length to prevent loosening by the wind.

c) Connect a length of 58U or 8U coax between the center "XMTR" terminal of the switch console box and your transceiver antenna terminal (any length).

PREPARING THE COAXIAL CABLES

To insure optimum results, we recommend that the vertical and horizontal coax be cut to the same length and to follow the prescribed lengths listed below. By using the lengths described below, the best horizontal to vertical separation will be achieved.

Connectors should be installed tightly and carefully so that they do not come loose. Tighten all connectors with pliers. Make sure to check that the connectors don't short out when the cables are wiggled after they are installed. (See special insert on the proper assembly of the connectors.)

LENGTH OF COAX TO BE USED

Coax cables using solid dielectric deteriorates in time and is not recommended, but lengths should be any multiple of 12 feet if this is to be used. If RG58U or RG8U foam insulated coax is used, lengths of each coax should be a multiple of 14 feet.

NOTE: In order to achieve the extra gain in the horizontal polarization over the vertical, it is recommended that the antenna be situated 36-feet above the ground or more if this is legally possible.

ON THE AIR CHECKS

With the V-H switch on V, turn the antenna with the rotor to attempt to pick up

a signal coming in about 6 S-Units. Carefully determine that the antenna is pointing to him by noting slight decreases as you rotate each side of him. Then switch to horizontal (H). If he is vertically polarized, his signal should drop at least 3 S-Units. As you rotate the antenna in either the vertical or horizontal mode, you will notice that the signal is greatly diminished at the rear of the beam.

Try doing the same thing to the other stations; similar minimum drops should be experienced. If you can contact another PDL-equipped station, you will note that if he also switches to horizontal, you will be able to carry on a very improved conversation.

Generally on skip, signals will come in better on horizontal than vertical. The manifold benefits of the PDL will be more apparent as you learn to use it. Often when man-made noise is rampant, switching to horizontal is the only alternative to getting out.

Sometimes depending on the installation, the V.S.W.R. on the horizontal mode will be a little high. This can usually be corrected by sliding the gamma rod out of the gamma tube ½".

FIGURE 1

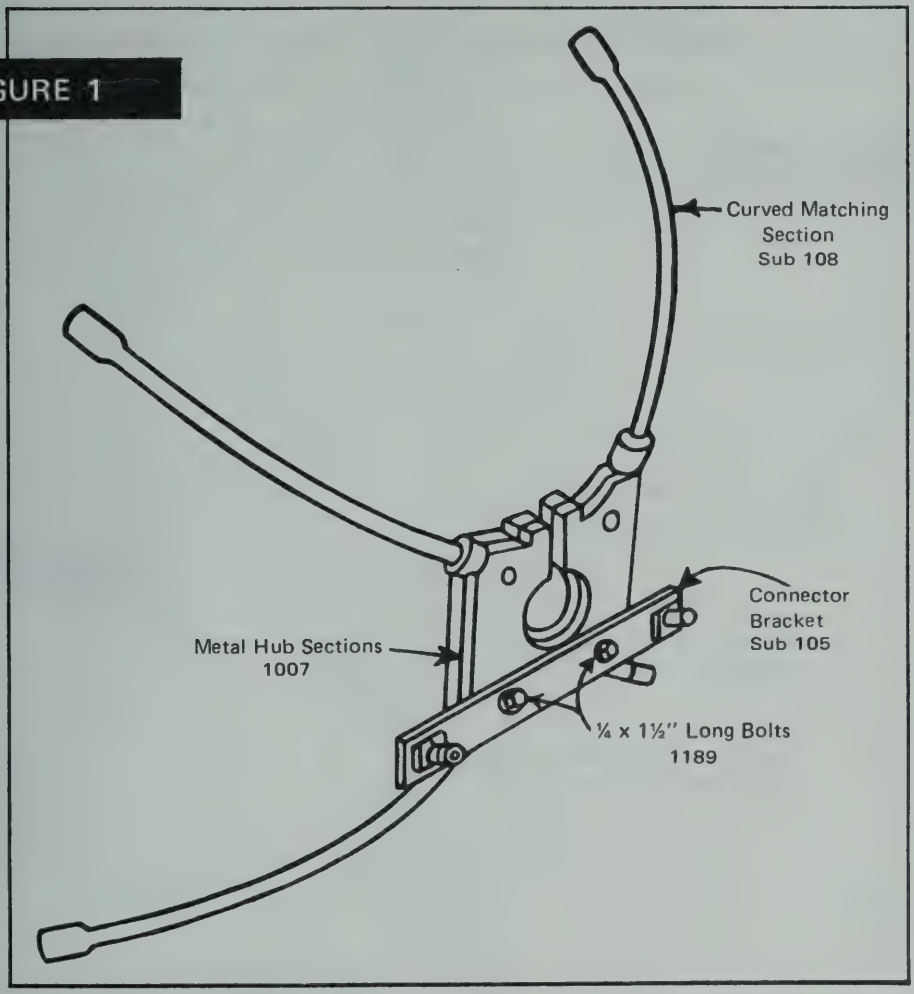


FIGURE 2

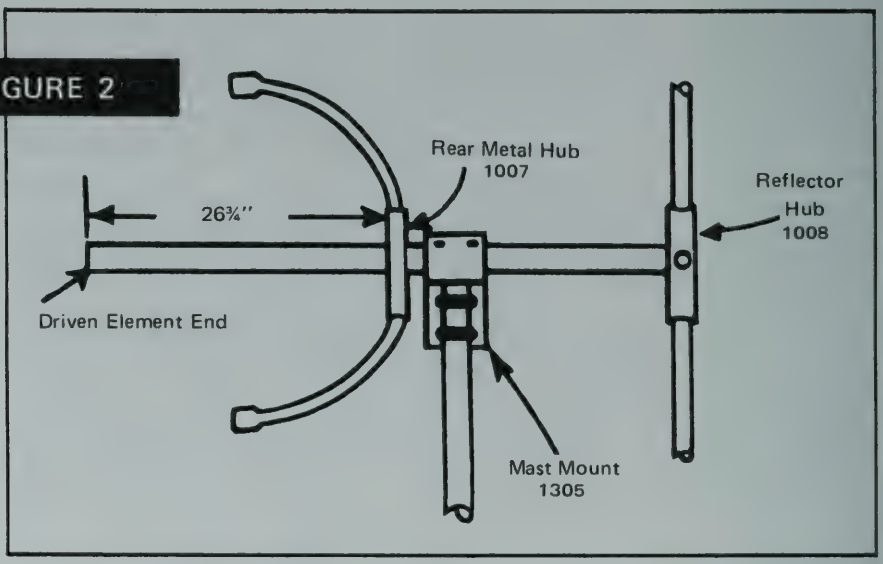


FIGURE 3

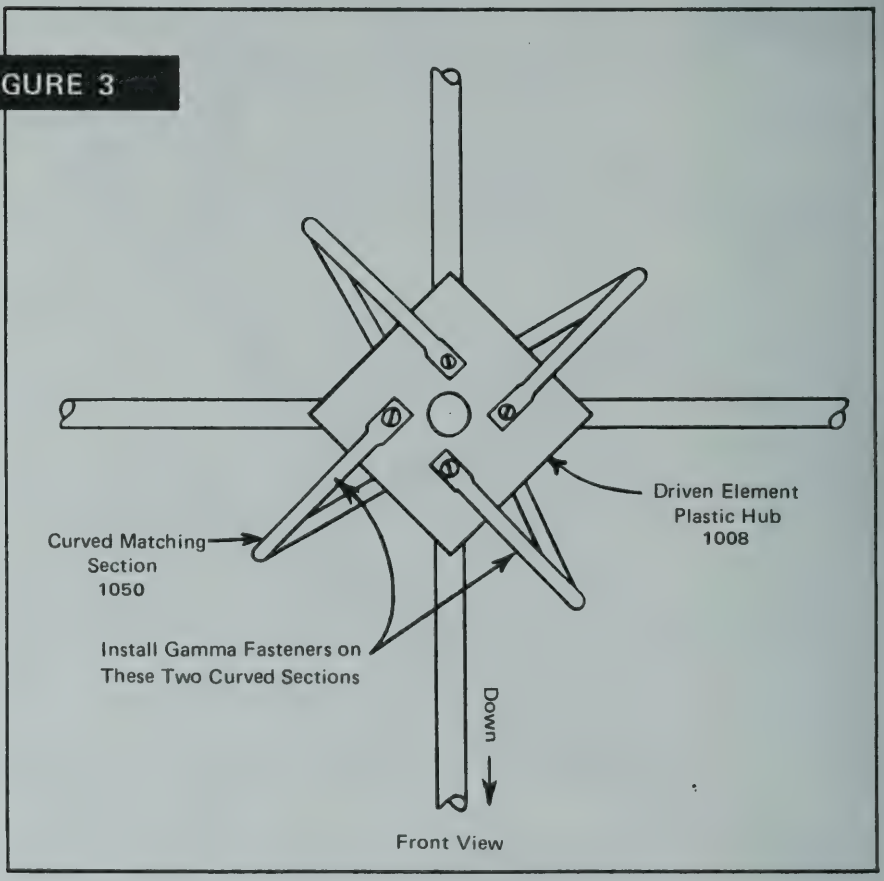


FIGURE 4

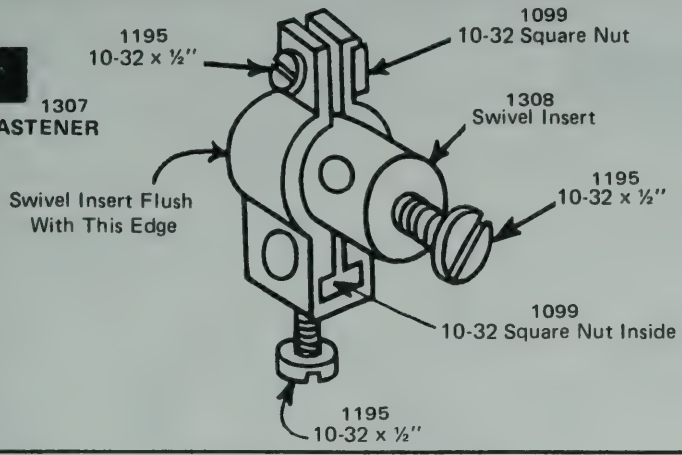


FIGURE 5

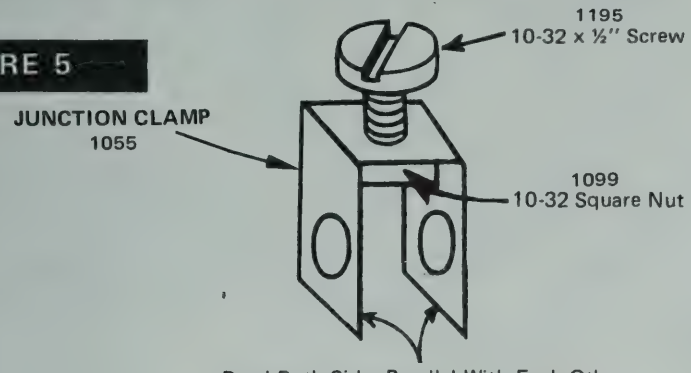


FIGURE 6

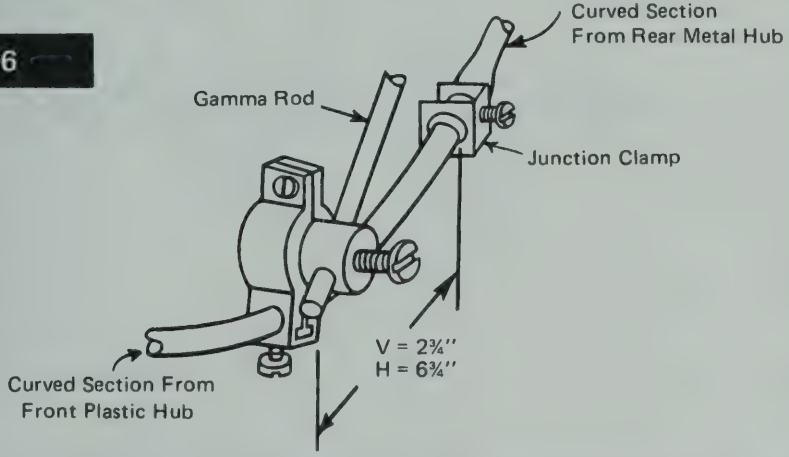


FIGURE 7

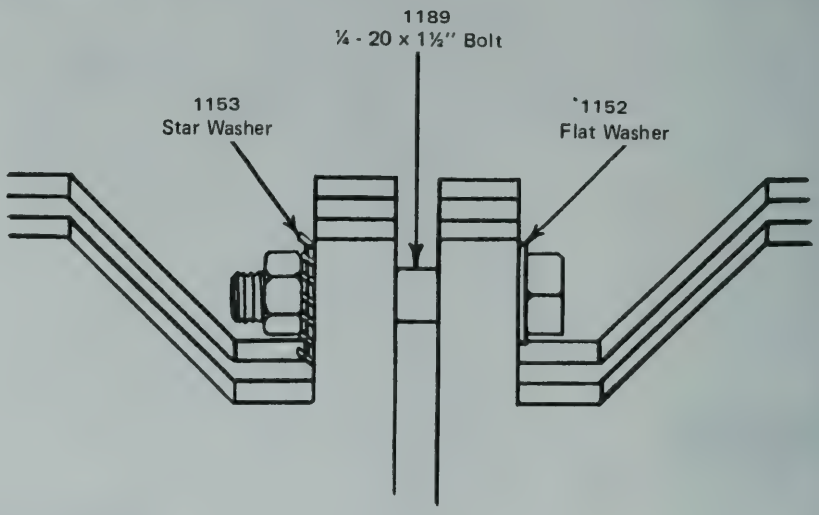


FIGURE 8

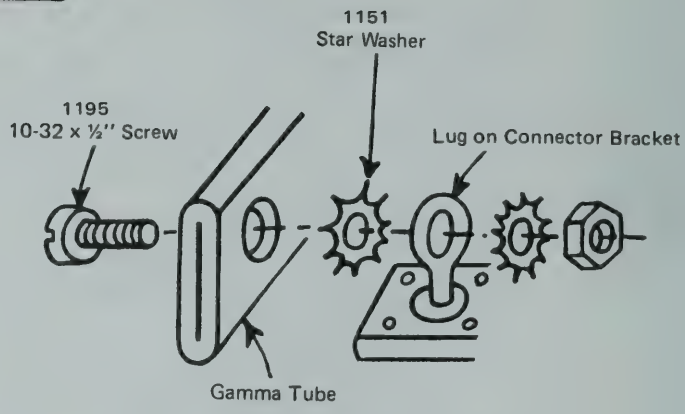


FIGURE 9

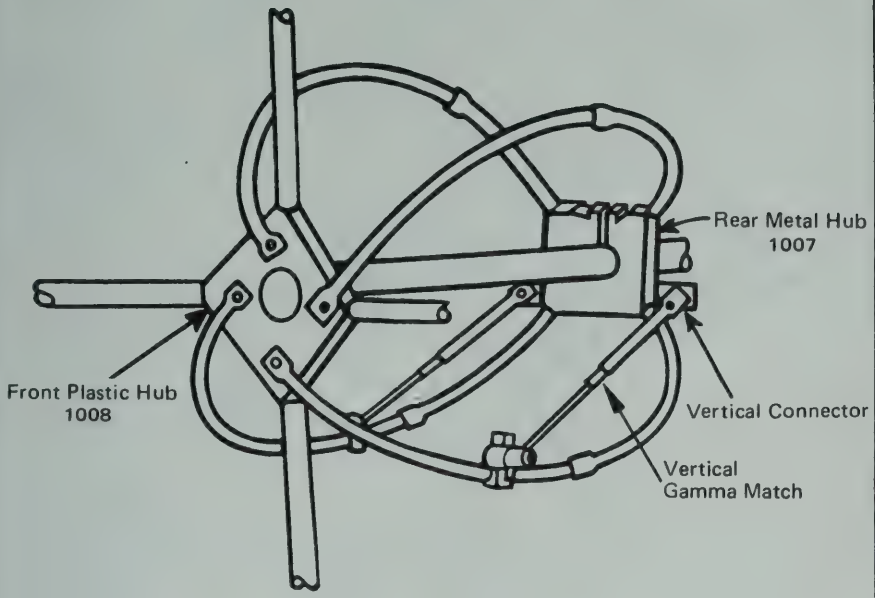

Rear Metal Hub
1007
Front Plastic Hub
1008
Vertical Connector
Vertical
Gamma Match

FIGURE 10

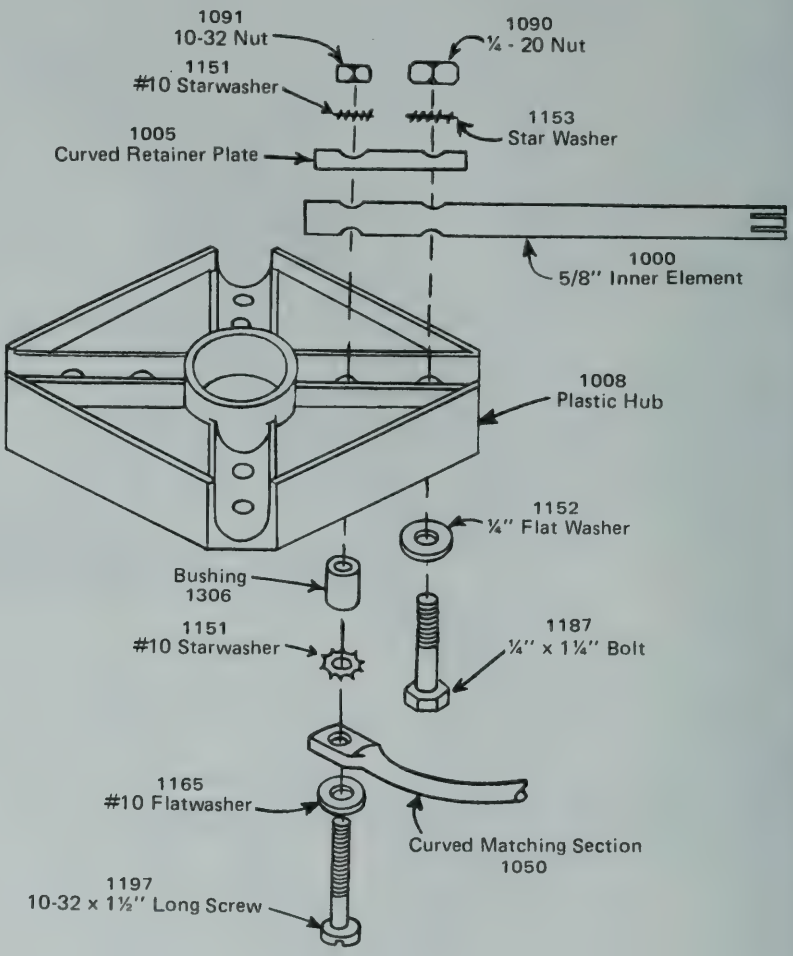

1091
10-32 Nut
1090
¼ - 20 Nut
1151
#10 Starwasher
1153
Star Washer
1005
Curved Retainer Plate
1000
5/8" Inner Element
1008
Plastic Hub
1152
¼" Flat Washer
Bushing
1306
1151
#10 Starwasher
1187
¼" x 1¼" Bolt
1165
#10 Flatwasher
Curved Matching Section
1050
1197
10-32 x 1½" Long Screw

FIGURE 11

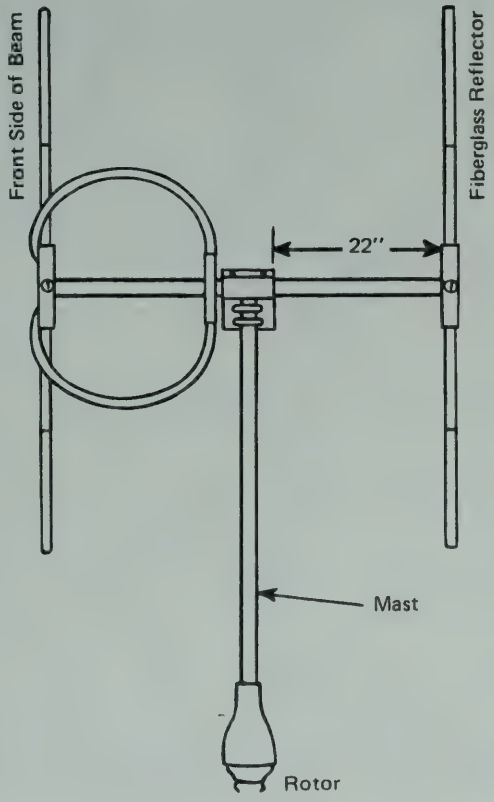


FIGURE 13

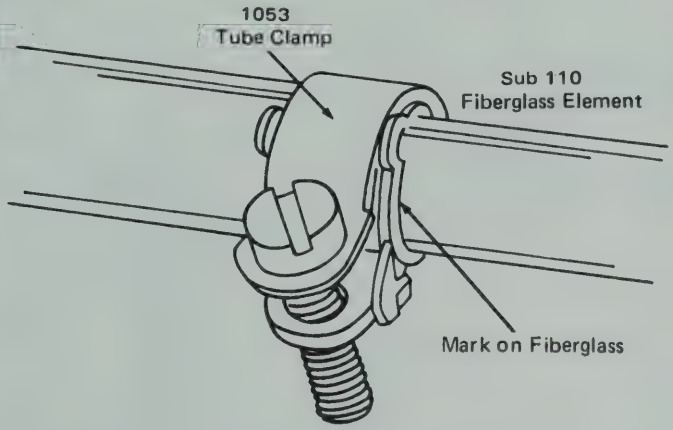
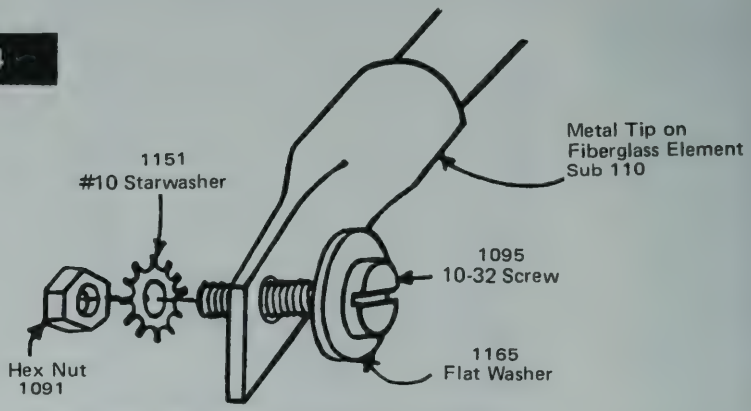
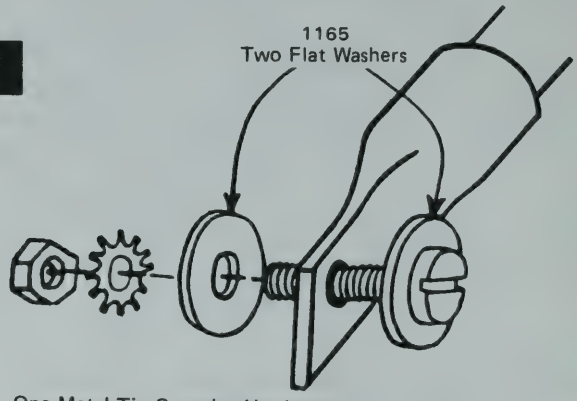


FIGURE 14



Three Metal Tips Contain Hardware in This Order

FIGURE 15



One Metal Tip Contains Hardware in This Order

FIGURE 16

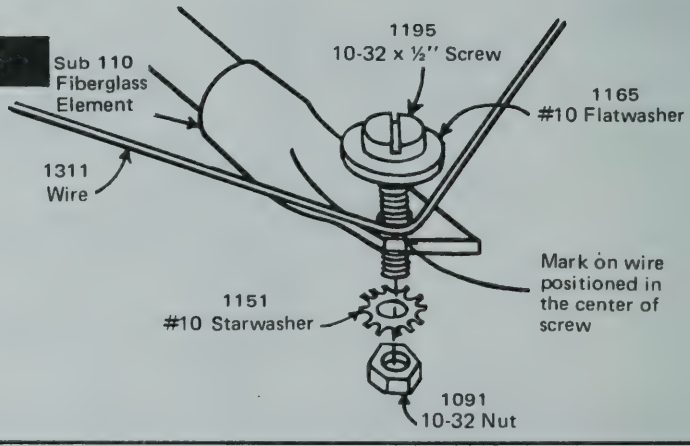


FIGURE 17

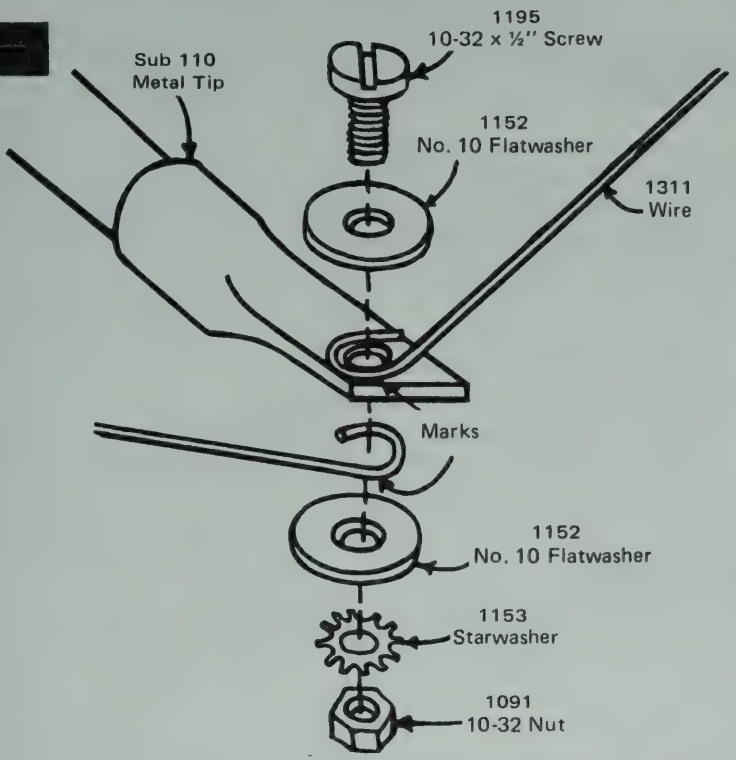


FIGURE 18

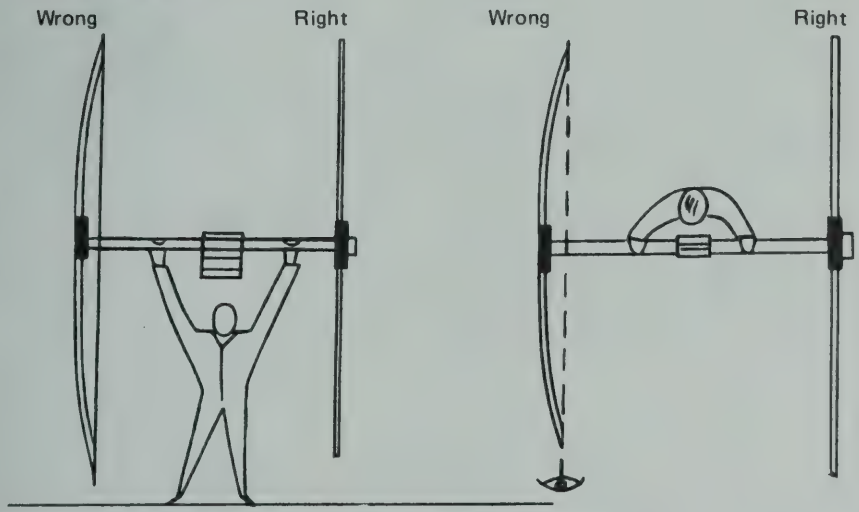


FIGURE 19

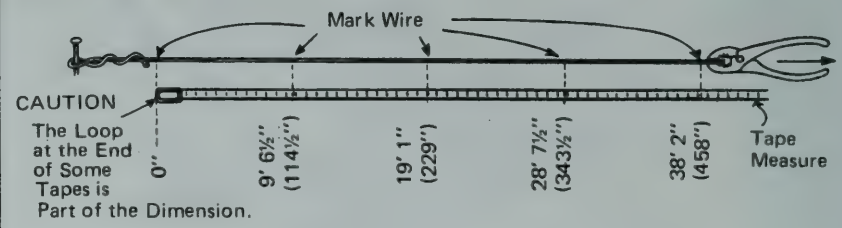
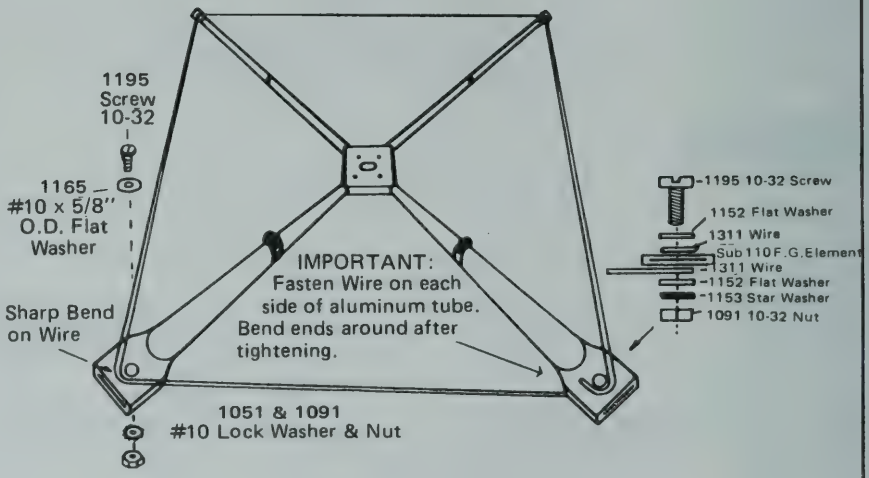


FIGURE 20



GAMMA ADJUSTMENTS FOR THE PDL-II

All S.W.R. measurements and adjustments should be made without using any switchboxes or any other devices in the coax line that is being checked. Connect the S.W.R. meter between the transmitter and the vertical or horizontal coax, whichever gamma you are adjusting.

It would be best if the S.W.R. readings are taken with the antenna mounted at its approximate operating height. An antenna being too close to the ground will change the S.W.R. readings. If the antenna must be tuned near the ground, it would be best if the antenna were aimed straight up into the air with no objects surrounding it. This will approximate the conditions when the antenna is mounted at its operating height.

Note: Do not stand near the antenna while making S.W.R. measurement. This will affect the readings.

For accurate S.W.R. readings, it is advisable to use ½ wave multiples of your coax line. If you are using regular RG-8U coax, it should be cut in multiples of 12 feet. If you are using RG-8U low loss foam type, the multiple should be 14 feet.

The gamma setting for the lowest S.W.R. consists of two adjustments on each (horizontal and vertical) gamma.

The vertical and horizontal adjustments will not interact. In other words, you may make adjustments on the vertical gamma without affecting the horizontal match and vice-versa. Refer to Figures 4 and 6 in the AV-120-2 instruction manual.

The two gamma adjustments are:

(1) The location of the gamma fastener on the curved section (normally set at 1¼" from the edge of expanded joint).
(2) The distance the ¼" gamma rod is inserted into the plastic of the gamma tube (not shown in Fig.).

(1) Before making any adjustments, check the S.W.R. at the factory recommended settings and record the reading on paper.

(2) Remove the spring clamps on the gamma tube and loosen the 10-32 screw in the swivel insert. (Fig. 4)

(3) Adjust the gamma rod by sliding the rod in or out of the plastic tube ¼" at a time, taking readings after each adjustment. The swivel insert screw should be tightened slightly after each adjustment so good contact is made. When the lowest S.W.R. has been achieved, temporarily lock into this position at the plastic end.

(4) If S.W.R. is still too high, loosen the screw that holds the gamma fastener to the curved section and also the swivel insert screw again.

(5) Adjust by sliding the gamma fastener back or forth ½" at a time taking S.W.R. checks after each ½" adjustment. Adjust until the lowest S.W.R. is obtained. If the lowest S.W.R. attained is still too high, repeat Step 3 followed by Step 4.

(6) These two steps can be repeated as many times as it takes to obtain a good match.

(7) After all adjustments have been made, retighten all screws and install the spring clamps.

ANTENNA TESTING VARIABLES

From time to time, many CBer's are heard to make the remark that a particular antenna is not living up to the advertised performance figures such as gain, S.W.R., or front-to-back ratio. These statements are usually founded on their personal field tests; often based on comparisons between one antenna and another. The disparity in the results between the tests of the CBer and the factory usually stems from the conditions under which the tests were run. The following is a short discussion of some of the variable conditions that do occur and how they affect antenna performance.

EFFECT OF OTHER ANTENNAS

When two antennas are mounted near each other (even if they are used for different frequencies), a coupling usually results which in some way alters their operation. This coupling is even more pronounced when the antennas are mounted less than one wavelength apart. So, if another antenna is less than 36 feet from your CB antenna, there is a good chance that it changes its performance in some way.

THE EFFECT OF METAL STRUCTURES

Not only antennas, but water towers, power lines, buildings, or any material of a metallic nature has the ability to misdirect transmission. Sometimes these obstacles will act as directors and sometimes as reflectors - causing the signal to increase or decrease in the intended direction.

Complaints of poor front-to-back ratio or lower than expected gain can usually be traced to this above circumstance - especially in beam-type operation.

SIGNAL INTENSITY

The signal strnegth of a remote transmitting station can never be assumed to be of the same strength as in previous transmissions. Signals of incoming stations should be recalibrated to the antennas being compared. For this reason, you cannot take down one antenna, put up another one week later, and expect to make accurate measurements. If the stations being used are using beam type antennas, a slight change in the beams' directions can also be critical. Contacts with mobiles are even less valid. A movement of five feet sometimes makes measurable differences in mobile communications.

S METER CALIBRATION

Depending upon the CB set, an S meter is calibrated so that one S unit is equal to 6 db. Therefore, an antenna responsible for 1 S unit gain over another has also about 6 db gain over that other antenna. Some S meters, however, are calibrated at only 3 db per S unit and others at 3 or 4 at the low end, and 6 or 7 at the top of the scale.

Another problem encountered with S meters is the ability to measure high strength inputs. Some bounce back at a powerful signal and appear erratic in operation even reading lower on the scale with an increased signal.

COAX AND CONNECTORS

The quality of the coax and connectors and especially the soldering of the coax to the connector can affect S.W.R. and gain. Many times an unsuspecting CBer will buy a low grade coax and lose 2 or 3 db after paying good money for an expensive transceiver and antenna. A quick check for good coax and connections can be run by substituting a dummy load on the antenna end of the coax. If all is right, the S.W.R. with the dummy load should be a 1 to 1 match.

CRYSTAL VARIATIONS

Mr. A. and Mr. B. are neighbors and they are comparing the performance of their antennas by their ability to transmit to Mr. C. about 20 to 30 miles away. If Mr. A. has a crystal slightly high on frequency, he might show a weaker signal to Mr. C. even though his operation has more power. This would make A's antenna seem inferior to B's. This problem can be eliminated by Mr. C's having a tunable receiver on his transceiver to match A's variation.

ANTENNA HEIGHT

Whenever antennas are being compared, they should be installed at the proper distance above the ground and preferably in an open field. This operation is not even legal for CB'ing when using a horizontal beam, because the proper distance above ground for this mode of transmission is 36 feet or more. Only the test of a vertical antenna may be run at a legal height of 20 feet in an open field.

TIME VARIATION

Any test of antennas should be performed with a time variation of about 15 minutes or less to eliminate variations due to tropospheric shifts and other changes that affect performance.

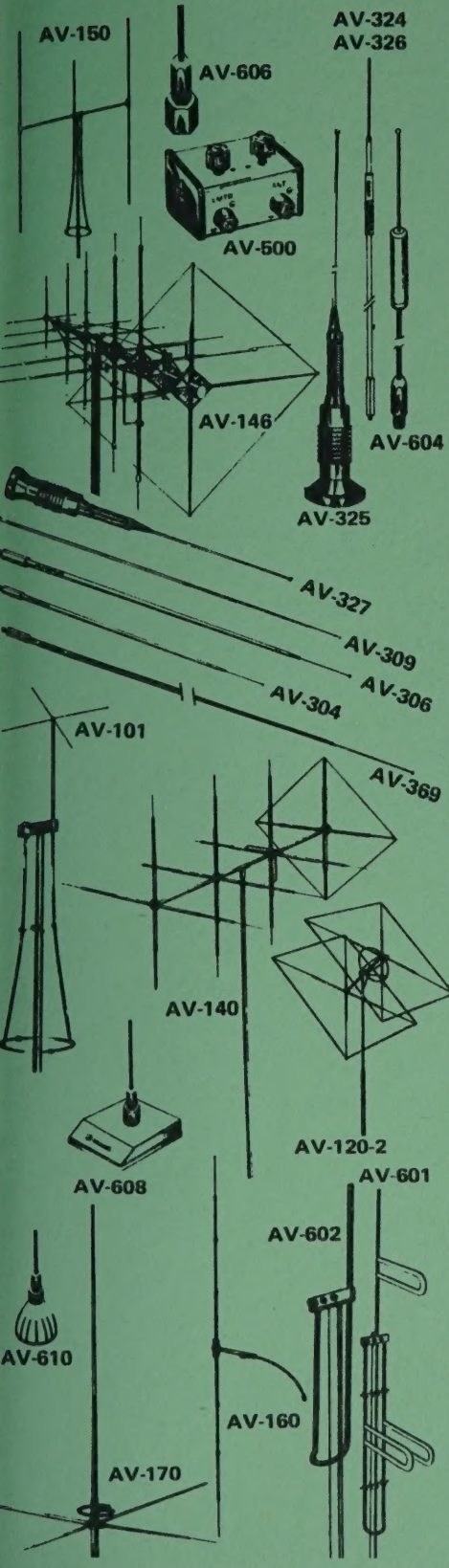
GUY WIRES AND SUPPORTING STRUCTURES

Guy wires should preferably be of the non-metallic type using ski tow rope or other plastic lines. If metallic guy wires are used, they should be broken up at uneven intervals along their length to avoid interference and possible high S.W.R. In many cases, a manufacturer intends his antenna to be mounted on a metal mast or tower and in some cases, the mast or tower is used as a radiating element.

PROPER CONSTRUCTION

If they could, manufacturers would ship all antennas fully assembled in order to eliminate mistakes in construction often found in antenna installations. Even the best instructions are sometimes mis-read and an antenna condemned only because of an error in assembly. If an antenna does not perform up to par, contact your local distributor or dealer, and if he can't help you, call the manufacturer. Chances are that somebody will get it working.

These are by no means all of the possible variations to consider in antenna measurements; however, they are some of the most important and understanding them will certainly be to the CBer's benefit and may save time in finding a trouble source.



AV-101 ASTRO-PLANE Base Station, 4.46 db, over Isotropic

AV-120-2 PDL II With New "Orbital Gamma Match" And AV-501 Switchbox, Dual Polarity

AV-130 STACKING KIT For 2 AV-120's Complete With Harness

AV-140 MOONRAKER Base Station With Switchbox, 14.5 db, over Isotropic

AV-146 MOONRAKER 6 Base Station With AV-502 Switchbox 17 db over Isotropic

AV-150 ASTRO-BEAM Base Station, 40 db Front to Back, 11 db over Isotropic

AV-160 RAMROD Multi-Purpose Base Station (Tunable 27-170 MHz)

AV-170 SIGMA 5/8 Base Station—Full 5/8 Wave Length, 5.14 db Over Isotropic

AV-304 4' Fiberglass RACER w/Tunable Tip

AV-306 6' Fiberglass RACER w/Tunable Tip

AV-309 96" Fiberglass RACER Whip

AV-324 4' HIPPO Top Loaded Mobile Antenna—250 Watts Maximum Power

AV-325 5' HIPPO Base Loaded Mobile — 500 Watts Maximum Power

AV-326 6' HIPPO Top Loaded Mobile Antenna—350 Watts Maximum Power

AV-327 RACER 27 Base Loaded Mobile With Spring, High Durability Tunable Whip

AV-369 GATOR-WHIP (Tunable 25-40 MHz)

AV-601 25-50 & 140-174 MHz Base Station Monitor (Dual Banded)

AV-602 440-470 MHz Base Station Monitor With 30" Mast

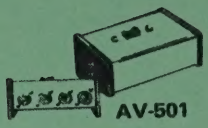
AV-604 25-50 & 140-174 MHz Mobile Monitor 3/8 Thread (Dual Band)

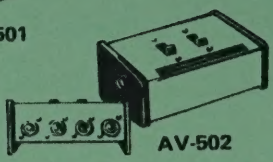
AV-606 Same as AV-604 With AV-506 Mount And 17' Coax

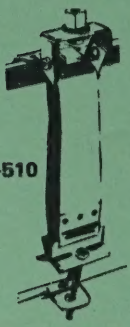
AV-608 Same as AV-604 With AV-508 Mount And 17' Coax

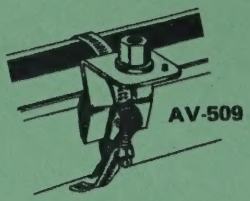
AV-610 Same as AV-604 With AV-503 Mount And 17' Coax

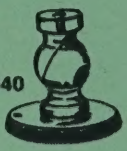
AV-500 500 Watt AVANTI Matchbox

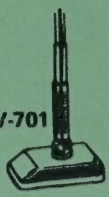


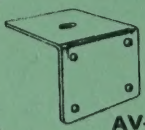


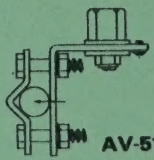












AV-501 CS-1 Coaxial Switchbox

AV-502 CS-2 Coaxial Switchbox For Use With Standby Antenna

AV-503 RACER 1/2" SNAP MOUNT With Standard 3/8-24 Thread

AV-504 Co-Phasing Harness For Installation Of 2 Mobile Antennas

AV-506 3/8-24 Adapter For Use With AV-521's Or Other Trunk Mounts

AV-508 AV-506 Installed In AV-521 No-Hole Trunk Lid Mount

AV-509 Bumper Strap Mount For Compact Cars 3/8-24 Threads

AV-510 Bumper Strap Mount For Standard Cars 3/8-24 Threads

AV-514 SUCTION CUP TIE DOWN—No Tools Necessary For Installation

AV-515 CAMPER Mount With 3/8-24 Threads—Fold-Down Feature

AV-516 TRUCK Side Mounted Mirror Bracke With 3/8-24 Threads

AV-517 CAMPER Bracket Mount With 1/2" Hole For AV-327

AV-521 No-Hole Trunk Lid Mount

AV-527 AV-327 With AV-521 No Hole Trunk Mount

AV-540 Cast Aluminum Swivel Ball Mount 3/8-24 Thread

AV-701 Special PROTECTIVE SPRING For AV-304's, AV-306's and AV-328's.

PK-120 PDL (AV-120) Power & Gain Kit Also Adds 1 db Gain For Older PDL's!

AV-530 Rubber Shock 3/8-24 Threaded Medium Duty Spring

AV-328 Fazer Top Loaded Mobile

AV-526 4' Hippo Mirror Mount Co-phase Package

AV-528 S.S. Fazer Stainless Steel Top-Loaded Mirror Mount Co-phase Package

AV-529 4' Racer Mirror Mount Co-phase Package

avanti
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